the OIL AND GAS JOURNAL

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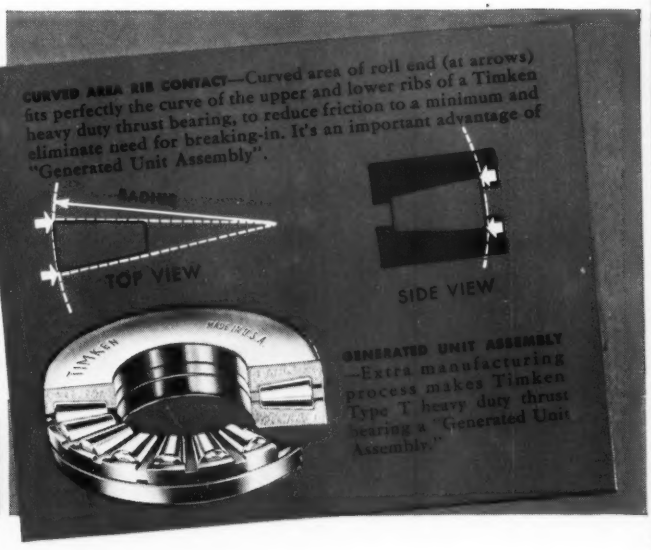
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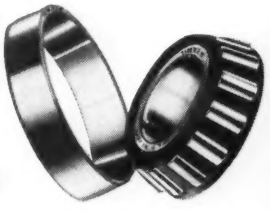

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*published weekly by the*

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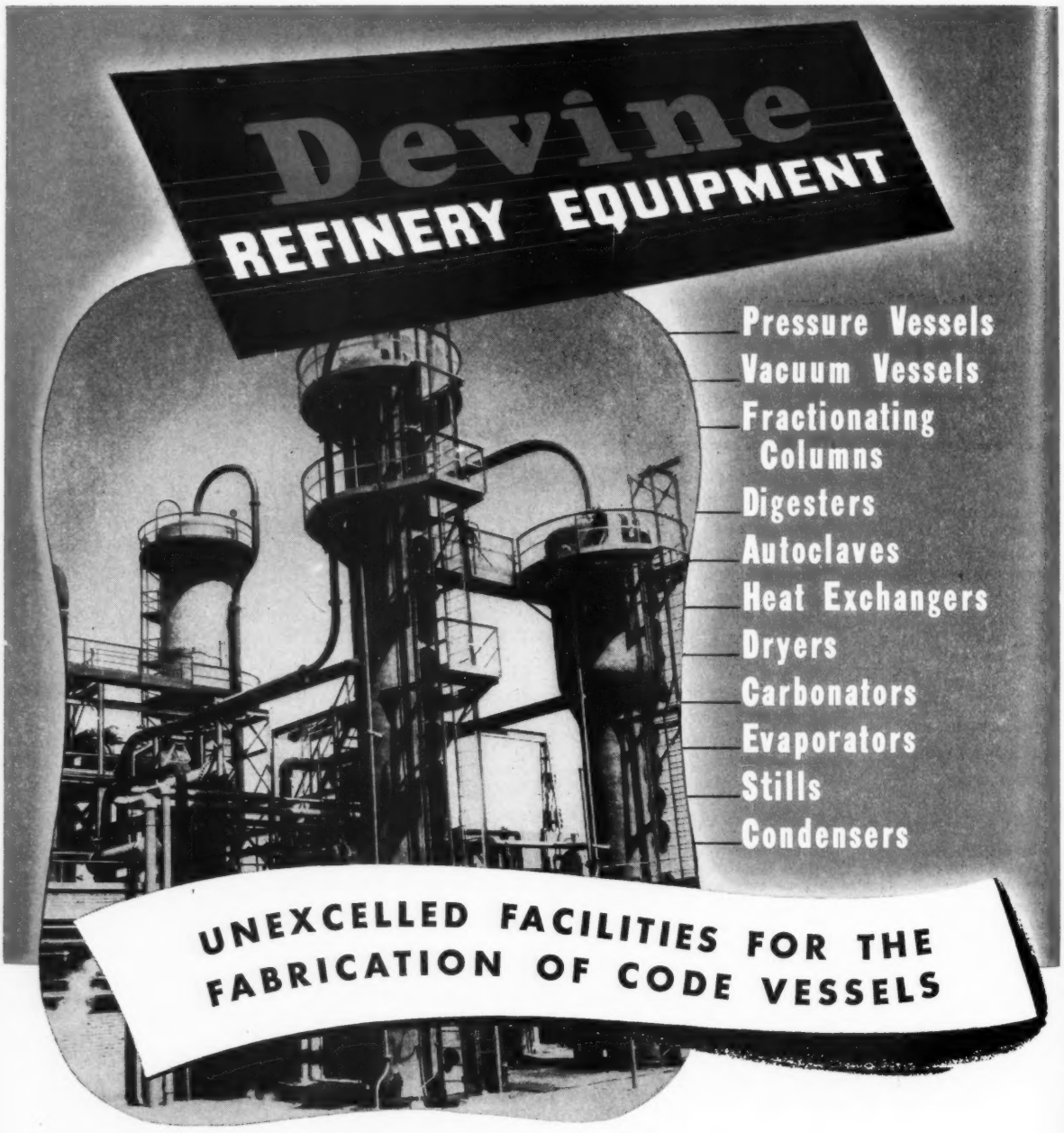


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# Avoiding Another Disaster

AS investigations are completed it is certain that units of the petroleum industry were in no way responsible for the Texas City disaster of April 16 and 17. This conclusion needs to be made clear to thousands of people who fear a duplication of the coastal catastrophe in their communities.

Reports are in agreement that the large loss of life and property damage was the direct result of the detonation of ammonium nitrate stored in two ships in Texas City harbor. Many were killed and injured by the two explosions which also initiated other fires and explosions over a wide area. These could not be brought under control until there had been a further loss of life and destruction of property.

The petroleum industry through the years has had an exceptional record in regard to fires and explosions. Operating with hydrocarbons, which either as crude oil or products and as liquids and gases, are readily combustible, the industry has perfected operating methods which have prevented major explosive or fire disasters in fields, plants, transportation services and hundreds of thousands of distributing facilities.

At this time, nearly 400 refineries and several hundred gasoline and cycling plants in this country are processing approximately 5,500,000 bbl. of crude oil and wet gases daily. Improperly designed equipment or careless operating practices could quickly result in fire losses. The production of liquefied gases in recent years and some of the recent petrochemical activities add to the potential dangers.

The lesson to be learned from the Texas City explosion is that it is not sufficient that refiners and chemical plant operators take every safety precaution within their gates. No plant could have been designed so as to be protected against the explosive effects at Texas City, when parts of ships were scattered over a large area. The wonder is that the losses at refineries and tank farms were not greater than they were.

It is apparent that regulations covering the shipping of explosives need to be changed to meet new conditions with greater emphasis on adequate inspection. All the larger refineries and most of the smaller plants in this and other countries necessarily are located within water or rail transportation centers. A ship or rail-car carrying explosives can nullify in a few seconds all the protective operating practices that have proved adequate in refining and allied plants operations.

It may be contended that prevention of these outside explosions is not the responsibility of the oil industry. But it has a direct interest, and quick action needs to be taken before a misinformed and alarmed public forces foolish regulations on the petroleum industry which in no way will solve the problems created at Texas City.

# Unanimous Decision Upholds FPC Authority in Interstate Case

WASHINGTON. — The Supreme Court has unequivocally upheld the jurisdiction of the Federal Power Commission to regulate the price of natural gas sold by a gatherer for subsequent movement in interstate pipe lines so long as there is no conflict with state conservation or other local regulation.

The unanimous decision, read by Chief Justice Vinson June 16, upheld the FPC order against Interstate Natural Gas Co., Inc., reducing by $596,320 its rates for sale of gas in Monroe field, Louisiana, to three trunk lines for movement outside the state.

The company contended the sale was not in interstate commerce and also was production and gathering outside FPC jurisdiction under Section 1 (B) of the Natural Gas Act. The court said there was no doubt the sale was in interstate commerce quite as much as if the company had moved it across a state line before selling, there is no distinction between sales at or before reaching a state line, and there is nothing in the Natural Gas Act nor its history to indicate that Congress intended a more restricted meaning of interstate commerce than that given it by the Supreme Court prior to passage of this law.

### Basic Purpose of Act

Turning to the production and gathering exemption, the court pointed out that prior to the law's enactment the states had been denied power to regulate sales of gas in interstate commerce and said the basic purpose of the law was to occupy this field. It was not the purpose to free such sales from effective public control, said the court, but rather to preserve in the states powers of regulation in areas in which the states are constitutionally competent to act.

Vinson wrote:

"Clearly, among the powers thus reserved to the states is the power to regulate the physical production and gathering of natural gas in the interests of conservation or of any other consideration of legitimate local concern. It was the intention of Congress to give the states full freedom in these matters. Thus, where sales, though technically consummated in interstate commerce, are made during the course of production and gathering and are so closely connected with the local incidents of that process as to render rate regulation by the Federal Power Commission inconsistent or a substantial interference with the exercise by the state of its regulatory function, the jurisdiction of the Federal Power Commission does not attach.

"But such conflict must be clearly shown. Exceptions to the primary grant of jurisdiction in the section are to be strictly construed. It is not sufficient to defeat the Commission's jurisdiction over sales for resale in interstate commerce to assert that in the exercise of the power of rate regulation in such cases, local interests may in some degree be affected."

### Gathering Not Defined

There is nothing in the decision to form the basis for a workable definition of production and gathering, and the court disposed of the complicated arguments made when the case was heard by saying:

"It is not contended that the commission is precluded from regulating the sales in question by reason of the exception to the commission's jurisdiction relative to the production of natural gas. Petitioner asserts, however, that the sales to the three pipe-line companies are a part of the gathering process and consequently not within the commission's power of regulation. This basic contention has given rise to a great many subsidiary questions such as whether the sales were made from petitioner's "transmission" line and whether the gathering process continued to the point of sale or was, as the commission found, completed at some point prior to surrender of custody and passage of title. We have found it unnecessary to resolve those issues.

"The gas moved by petitioner to point of sale consisted of gas produced from petitioner's wells commingled with that produced and gathered by other companies and introduced into petitioner's pipe-line system during the course of the movement. By the time sales are consummated nothing further in the gathering process remains to be done. We have held that these sales are in interstate commerce. It cannot be doubted that their regulation is predominently a matter of national, as contrasted to local concern. All the gas sold in these transactions is destined for consumption in states other than Louisiana. Unreasonable charges exacted at this stage of the interstate movement become perpetuated in large part in fixed items of cost which must be covered by rates charged subsequent purchasers of the gas, including the ultimate consumer. It was to avoid such situation that the Natural Gas Act was passed." *(For comments on this significant opinion, see Watching Washington, page 70.)*

## Gas-Distillate Wells In Carthage Pool Sold

Purchase of six producing gas-distillate wells in Northeast Carthage pool in Panola County for a price in excess of $1,000,000 has been reported.

The wells, on a 3,300-acre tract, were bought by James F. Gray and associates, Dallas, from H. B. Turner and Walter Smith, Carthage. All wells are under a gas-purchase contract with Arkansas Louisiana Gas Co.

# Justice Department Files Antitrust Suit Against Cotton Valley Operators

WASHINGTON.—An antitrust suit charging illegal cooperative action in a recycling operation has been filed by the Department of Justice in the federal court at Shreveport, La., against the Cotton Valley Operators Committee, 15 corporations, and 18 individuals.

Attorney General Clark stated that the suit does not attack joint activity in the production of wet gas, in the removal of hydrocarbons, or in the maintenance of underground pressure by reinjection, or any activity necessary to conservation, but is directed against joint activity in processing and refining the products of the gas and their joint sale through selected trade channels at fixed prices.

The complaint charges that the defendants unlawfully agreed to exclude others from the business of extracting, processing, and refining hydrocarbon products and from selling and distributing the products, and also that they fixed uniform prices and terms of sale and sold only through selected channels of distribution. The court is asked to enjoin the committee and the other defendants from engaging in joint activities except those necessary for separation of products from wet gas and reinjection of the residue for purposes of further production.

# NPC Report Asks Halt to U. S. Priority Equipment Purchases

DISCONTINUANCE of federal purchases of scarce industrial materials for foreign governments and revision of export regulations interfering with operations of the American petroleum industry abroad are recommended by a special committee of the National Petroleum Council as ways of balancing oil-equipment supply and demand.

The committee, headed by Claude Parsons, vice president of Hughes Tool Co., Houston, declared that "foreign-government requirements should come only after our own needs for materials are met" and that the present system of preferentially handling foreign government requirements of critical materials through directives, priorities and controls "weakens our own position in world markets."

The 13-page report, the third made by the committee, will be submitted to the council at its July 10 meeting in Washington. The committee pointed out an improved labor situation and suspension of price controls led to an improved supply of materials since its earlier reports last November and January, but asserted unexpected and greatly increased demand for petroleum products has since again tightened the supply of industry equipment of many types.

### Special Study of Casing

The report reviewed various forecasts indicating unprecedented demand and described the supply of major types of equipment separately. It devoted a special section to oil-well casing and urged that supply companies see that their products go directly at established prices from the regular distributors to the operators who use them, to avoid a situation the report said had reached a "racketeering stage" through bonuses and "middlemen." As another step to alleviate casing supply, operators should review their orders and "make them as realistic as possible thereby reducing the theoretical backlog and long delivery dates now being quoted by manufacturers," the report said.

Discussing the supply of equipment for foreign areas, the committee said the administration of export regulations and controls has given preference to foreign-government requirements and "shows a lack of understanding of the needs of the American petroleum industry . . ." It said reports show 82,250 tons of casing and line pipe—about 6 per cent of total production—was exported during the first quarter. Of this amount, about 28,800 tons is going to countries in which Americans have little if any interest, and the committee said it believes such shipments should be deferred "until after our supply is in balance with our demand at home."

While increased over-all demand was cited as the main reason for continued equipment scarcity, the committee also mentioned that new conservation regulations for the production of oil in Texas are adding to the requirements for compressors and other materials for recycling and repressuring. It pointed out distribution is handicapped by a lack of tank cars and tank trucks, and added that it is expected the increasing demand for products will soon overtax present total refining capacity, and additional facilities will be necessary in the branch of the industry.

The following materials, which the committee said are still far short of demand, were discussed as follows:

**Casing and tubing, oil well, seamless.**—Casing, although in greater supply from the mills in the first quarter than ever before, as indicated by the record number of wells and footage drilled, became considerably confused in its distribution. Present plants operated at near capacity during first quarter. Among their problems were: a shortage of fuel in January and February; car shortages; occasional steel shortages; difficulties in obtaining supplies for repairs and replacements of badly worn equipment.

**Line pipe.**—Similar conditions exist in this item as in casing except that in the smaller sizes many other consuming industries are competing for the supply and in the large diameters there is an unprecedented demand for proposed pipe lines to meet the demand of the American people for natural gas. All sizes are in short supply but especially 1¼ to 4 in. and 16 to 32 in. The mills are sold out in these sizes well into 1949 and 1950. It is aggravated by a shortage of steel plate, which prevents the mills from operating at capacity, and which especially affects mills which depend upon outside sources for plate.

**Compressors and pumps.**—New Texas conservation regulations are causing increased demand. Manufacturers are handicapped by a shortage of bronze castings due to a continued shortage of copper. Delivery promises on compressors is 12 months; on reciprocating pumps 6 months; on large centrifugal pumps 10 months; on large turbines 9-12 months.

**Plate, structurals, castings, sheets.**—Fabricators of refinery equipment, pipe, tanks, etc., have manufacturing capacity but do not have sufficient steel. Additional sheet and strip mills are due to start rolling in the last half of 1947. The steel-plate situation is still aggravated by labor incentives being on a tonnage basis, which discourages production of thin plate used for large-diameter line pipe. Delivery on mill-ordered plate requiring no fabrication is 9 months; on fabricated structurals 12-15 months. On drums, fractionating towers, reactors and regenerators, 12-15 months; on exchangers 10-12 months.

**Tin mill products.**—Shortage caused by the Government shipping considerable tin plate to foreign governments (approximately 125,000 tons allocated for this purpose in first quarter and 500,000 tons estimated for 1947); also caused by the Government shipping finished containers abroad.

**Electrical equipment.**—Manufacturers not recovered from strikes of 1946. Also, there is a continued shortage of copper. The present backlog of orders indicates that supply will not balance with demand until late in 1948 or early 1949.

**Caustic soda, soda ash, phosphates.**—Still very tight, but should ease up considerably during the last 6 months of 1947.

**Pipe-line felt.**—Still very short due to tremendous demand and the outlook is that it will continue to be short until well into 1948.

**Tank trucks.**—While these have been tight, the operators who projected their programs far enough in advance are not experiencing undue difficulty; the supply will continue to improve provided there are no further strikes. Considerable shortage was due to a strike which curtailed production of a large manufacturer for many months.

**Valves and fittings, forged and malleable.**—Shortage continues due to greatly increased demand and to a shortage of castings.

### Two Equipment Reports

**This article summarizes the findings in the latest report of the National Petroleum Council's special committee investigating equipment supply. A report of the meeting of another equipment-supply committee, that of the Independent Petroleum Association of America, is found on page 58. The two committees in general agreed in laying blame, in part at least, for the equipment situation on present government priority buying for foreign governments.**

## One-Fourth Tubular Output Goes to Oil, Gas Industry

During 1946, the oil and natural-gas industry maintained its position as a major user of steel pipe and tubes, accounting for 26 per cent of total shipments of these products, according to preliminary data of the American Iron and Steel Institute.

Total 1946 shipments to the industry of 1,225,425 net tons of tubular products, almost equaled the total of 1,228,642 net tons shipped to the group in 1940. Of that total amount shipped to the oil and gas industry during 1946, 716,424 tons went to jobbers, dealers and distributors of such products, the largest amount received by this group since 1940, with the exception of the abnormal war-peace year of 1941, the institute said. Another 419,995 tons went directly to the oil and natural-gas industry for construction purposes, including the building of pipe lines, and 89,006 tons went to the industry for other purposes. The steel industry produced 4,633,231 tons of steel pipe and tubing in 1946, and about 8 per cent or 385,000 tons were exported.

# I.P.A.A. Materials Committee Wires Priorities Protest to Krug

A VIGOROUS protest against priority exports of oil equipment was voiced by the material shortage committee, Independent Petroleum Association of America, which met in Dallas June 12 to initiate a study of current shortages of critical materials, particularly oil-country tubular goods. The 17-man committee, headed by J. E. Warren, Midland, Tex., was authorized at the association's mid-year meeting May 9, in response to a strong demand from operators whose drilling efforts are curbed by a severe lack of pipe and casing.

A study of the many ramifications to the problem led the committee to the conclusion that increased exports of pipe and casing are currently aggravating the shortage at home which may prevent the domestic industry from meeting record public demands, out of crude reserves now the greatest in history. Responsibility for this anomalous situation was laid directly to government agencies which allegedly are not only allowing but promoting export of critically needed pipe, at the same time warning the public of shortages in domestic production of petroleum products.

### Committee's Findings

While current pipe exports were declared the crux of the problem the committee recognized other contributing factors to the current pipe shortage. Among the committee's conclusions were:

"The underground petroleum reserves of this nation are at an all-time high, and there is no shortage of crude oil necessary to furnish the domestic requirements of the consuming public in the foreseeable future.

"There will be spot shortages of crude oil and its products in certain areas caused by shortages of materials to facilitate transportation both by rail and pipe line.

"The rate of developing new wells is not keeping step with the accelerated consumer demand for petroleum products, and our study indicates that the critical shortages of materials have caused this lag in development. The oil industry met the war requirements with a minimum of materials and is now faced with a far greater demand which can be met without difficulty provided materials are available for adequate development.

"The records show that large tonnages of oil-field material are exported under our Government's priority rating to foreign nations. These priorities should be discontinued to allow the domestic industry to keep our reserves and productive capacity at a safe level which will meet any demand or emergencies.

"In view of the present and anticipated future high demand for petroleum products we urge the manufacturers of oil-field materials and tubular goods to speed rehabilitation of present productive facilities so that their capacity can meet the industry's requirements."

### Text of Krug Wire

The committee dispatched the following telegram to Secretary of the Interior Krug:

"We understand that you have called a meeting June 17 of cabinet members and representatives of the War and Navy Departments to discuss the petroleum supply situation. The work of our committee clearly indicates that the apparent shortage of oils is due to lack of productive capacity and transportation facilities, which are, in turn, due to lack of necessary materials, such as tubular goods, line pipe, and tank cars, which are in extremely short supply.

"The petroleum reserves in the United States are at an all-time high and study of the facts shows that this reserve position can be maintained and bettered if we are given the materials with which to work.

"The committee unanimously agrees that when sufficient materials become available, the local areas now found with a temporary products shortage will have an adequate supply.

"We respectfully urge that you prevail on your associates in government to discontinue the present priority policy of exporting to foreign nations materials badly needed by our petroleum industry until domestic requirements have been met."

As a basis for its findings the committee considered the records of the steel and oil industries over the past several years. A comprehensive report on the materials situation was given by Claude P. Parsons of Houston, who is chairman of the Materials Committee, National Petroleum Council. *(See story, page 57.)*

Other recommendations of the I.P.A.A. committee asked consideration by state regulatory bodies to requests that casing programs in all fields be revised where possible "so as to minimize pipe requirements and increase protection by other means, but always with due regard to the safety factors involved."

### Sales to Users Asked

"It is further recommended that the supply companies be requested to continue their efforts to direct their sales and distribution so as to result in the great possible flow of tubular goods into the hands of the actual producers . . . In this connection it is recommended that each member of the association use his every effort and opportunity to obtain all pertinent information possible on any practices not in keeping with this program and to report same to the Tulsa office." The committee also urged that any excess orders be cancelled and that any inventories in excess of actual needs be made available to the industry in general.

The report of the I.P.A.A. committee commended Sen. Ed H. Moore of Oklahoma for his opposition to the War Powers Act since, it said, export controls and priorities purchasing of the Government stems from this authority. It also said a statement of commendation should be sent to various rolling mills for their efforts to serve the domestic oil industry and requesting their continued cooperation in the form of rehabilitation of facilities and capacity production.

Data considered by the I.P.A.A. committee in arriving at its conclusions, included that shown in the accompanying table.

**TOTAL EXPORTS OF SEAMLESS AND WELDED CASING AND OIL LINE PIPE**

| Country of destination— | Prewar quarterly average, 1935-1939 (net tons) | Quarterly avg. 1946 Net tons | Quarterly avg. 1946 Increase over prewar (%) | First quarter 1947 Net tons | First quarter 1947 Increase over prewar (%) |
|---|---|---|---|---|---|
| Venezuela | 5,445 | 17,395 | 219.5 | 27,366 | 402.6 |
| Mexico | 939 | 1,265 | 34.7 | 14,488 | 1,442.9 |
| Middle East* | 641 | 4,605 | 618.4 | 8,556 | 1,234.8 |
| Colombia | 2,114 | 3,973 | 87.9 | 7,163 | 238.8 |
| U.S.S.R. | 11 | 7,384 | (640 times) | 4,745 | (430 times) |
| East Indies | 952 | 187 | —80.4 | 3,150 | 230.9 |
| Peru | 356 | 2,114 | 493.8 | 2,675 | 651.4 |
| Canada | 832 | 2,657 | 219.4 | 2,463 | 196.0 |
| Argentina | 463 | 595 | 28.4 | 1,955 | 322.2 |
| Br. Malaya | 172 | 199 | 15.7 | 1,484 | 762.8 |
| Trinidad and Tobago | 525 | 494 | —5.9 | 1,286 | 145.0 |
| India | 884 | 315 | —64.4 | 611 | —30.9 |
| All others | 2,750 | 3,762 | 36.8 | 6,308 | 129.4 |
| Total | 16,084 | 44,945 | 179.4 | 82,250 | 411.4 |

*Includes Saudi Arabia, Kuwait, Bahrein, Iran, Iraq and Palestine.

Source of data: U. S. Department of Commerce reports on exports of Classes 606200 and 606300 casing and oil line pipe.

# this week

**NATURAL GAS**— Interstate Natural Gas Co. case decided in favor of FPC by unanimous Supreme Court decision. . . . Opinion greatly extends power of commission in the direction of production and gathering. . . . Ruling expected to add impetus to drive for congressional action limiting FPC jurisdiction. . . .

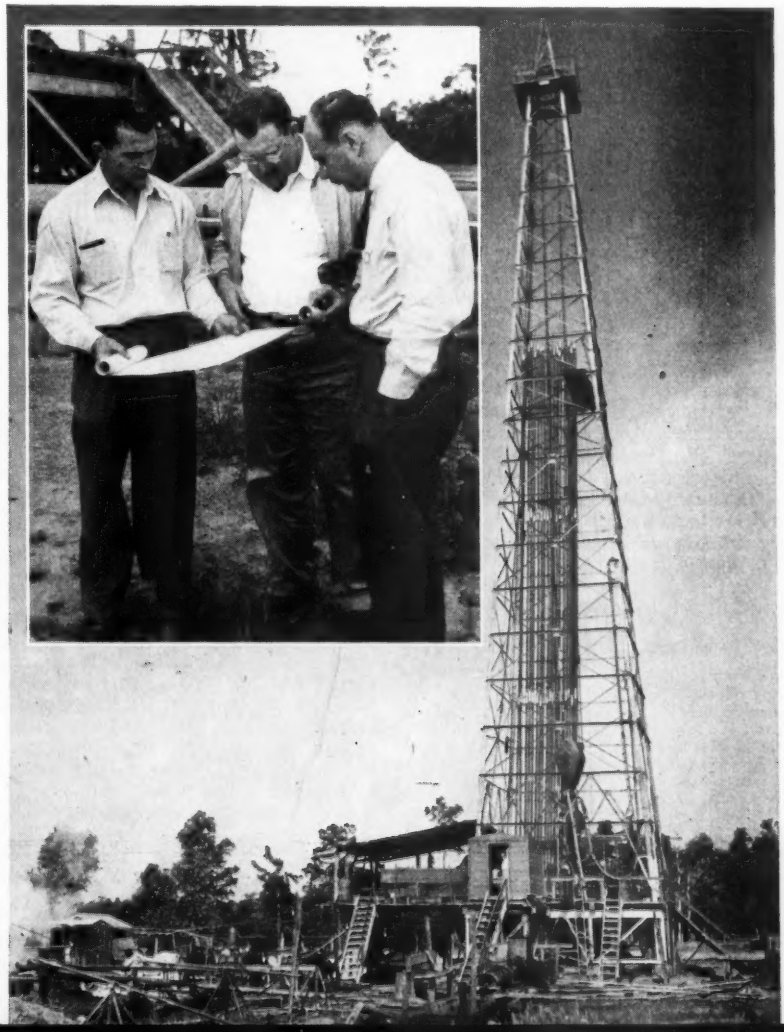
**REFINING**— Standard of Jersey preparing to start $26,000,000 expansion at Bayway, N. J., refinery in near future. . . . Program includes new vacuum pipe still, Fluid cracking unit, and other facilities. . . . ¶Phillips exercises option, acquires controlling interest in Wasatch Oil Refining, Salt Lake, and Idaho Refining, Pocatello, through stock exchange. . . . Companies to continue under substantially same management. . . . ¶Aurora Gasoline Co. completes small-capacity Fluid catalytic cracking unit in plant in Detroit. . . .

**MATERIALS SUPPLY**— Special NPC committee issues detailed report analyzing current scarcity of certain types of equipment. . . . Recommends government priority buying for foreign governments be discontinued, favors equipment exports only to operations of American interests abroad. . . . ¶I.P.A.A. materials-shortages committee meeting in Dallas blames State Department priorities for foreign shipments for situation, wires Secretary Krug for support in halting priority buying. . . . ¶Iron and Steel Institute reports oil and natural-gas industries took 26 per cent of tubular production in 1946, says about 8 per cent of output was exported. . . .

**PRODUCTION**— Refinery runs to stills climb 148,000 bbl. daily to reach new all-time high for week ended June 7. . . . Industry now operating at 91.9 per cent of capacity. . . . ¶Crude production continues to mount. . . . Daily average reaches 5,117,890 bbl. during week ended June 14, according to The Oil and Gas Journal's tabulation. . . .

**SUPPLY AND DEMAND**— Bureau of Mines makes upward revision in 1947 forecast, declares estimate now represents probable supply rather than potential ability of the nation to consume petroleum products. . . . Forecast says limiting factor is refining capacity. . . . ¶Interior Secretary Krug, other higher government officials meet in closed conference to discuss petroleum-supply situation.

**EXPLORATION**— Sunray completes well in new pay in South Haldeman area, Jim Wells County, Texas, at 5,150-55 ft., flowing 216 bbl. 45.7°-gravity oil per day. . . . ¶Wilson Oil Co. well on south side of West Eunice field, Lea County, New Mexico, flows 2,400 bbl. oil per day from 3,736-40 ft. . . . ¶San Augustine County, Texas, gets first production in M. E. Davis et al. 1 Johnson, 3 3/4 miles north of town of San Augustine. . . . Well flows 17 bbl. oil per hour from Pettit at 8,130-60 ft. . . .



*Another county has been added to the East Texas counties producing oil or gas by this wildcat, the Hiawatha Oil & Gas Co. and M. E. Davis et al 1 W. A. Johnson, in San Augustine County. Hiawatha Oil & Gas Co. is an interest of Michael L. Benedum, well-known wildcatter. Benedum has opened such fields as Robinson in Illinois, Caddo in Louisiana, Colombia's Tropical, and Big Lake, Yates, and Desdemona fields in Texas. This latest discovery is 100 miles southwest of Shreveport and in territory oil men considered dry, according to Benedum's nephew, Paul C. Benedum, who is president of Hiawatha. (For further details on the well, see page 139.) Inset picture shows W. W. Bynum and Joe McMahon, Hiawatha Oil & Gas Co., and S. W. Fruehling, Seismograph Service Corp. party chief, at the well*

# Production Runs at All-Time High; Bureau Hikes Demand Forecast

CRUDE-OIL production and refinery runs have reached all-time highs, surpassing even wartime records, in the face of the continued tremendous postwar demand for petroleum products. Also indicative of the tempo of operations in the industry is a new Bureau of Mines demand forecast increasing the previous estimate 1.4 per cent.

U. S. crude production averaged 5,117,890 bbl. daily during the week ending June 14, an increase of 40,750 bbl. over the previous week and the sixth straight week in which the all-time production record has been broken. Outstanding gains included: Kansas up 15,600 bbl. to 280,500, Wyoming up 5,930 bbl. to 120,380, Montana up 5,350 bbl. to 25,090, Illinois up 2,400 bbl. to 190,400, Indiana up 2,000 bbl. to 18,800, Mississippi up 2,000 bbl. to 95,500, and Arkansas up 1,300 bbl. to 81,450.

California was down 3,800 bbl. to 914,800, the Eastern area was down 2,000 bbl. to 64,500, and Oklahoma was down 1,050 bbl. to 388,150. Texas remained unchanged at its record high of 2,288,950 bbl.

Crude runs to refineries, as disclosed by the weekly report of the American Petroleum Institute, passed the 5,000,000-bbl. daily mark for the second consecutive week for the week ended June 7 and surpassed the wartime high of 5,140,000 bbl. The new record of 5,148,000 bbl. was achieved in spite of the fact that some 90,000 bbl. daily capacity is shut down because of strikes in Pure Oil Co. plants.

Some significant regional changes in refinery runs can be seen from the accompanying table which compares the wartime peak runs of the week ended August 18, 1945, with the new all-time high of June 7. *(Other information on the high level of refinery runs was published in The Oil and Gas Journal, June 14, page 68).*

**RUNS TO STILLS**
(In barrels daily)

| Area— | August 18, 1945 | June 7, 1947 |
|---|---|---|
| East Coast | 810,000 | 900,000 |
| Appalachian | 168,000 | 165,000 |
| Ind., Ill., Ky. | 779,000 | 822,000 |
| Okla., Kans., Mo. | 410,000 | 421,000 |
| Inland Texas | 251,000 | 223,000 |
| Texas Gulf | 1,248,000 | 1,136,000 |
| La. Gulf | 282,000 | 420,000 |
| No. La., Ark. | 76,000 | 65,000 |
| Rocky Mt. | 137,000 | 140,000 |
| California | 979,000 | 856,000 |
| Total | 5,140,000 | 5,148,000 |

The new Bureau of Mines forecast of demand for all oils in 1947 is 2,092,400,000 bbl. The bureau states that demand has reached such high levels that the forecast represents more nearly the probable supply of refined products available than the potential ability to consume oil. The limiting factor is refinery capacity, not demand.

The revised forecast for 1947 on supply and demand of all oils is as follows, in millions of barrels:

| | |
|---|---|
| Demand— | |
| Motor fuel | 825.6 |
| Residual fuel | 511.2 |
| Distillate fuel | 310.7 |
| Kerosine | 110.4 |
| All other | 334.5 |
| Total | 2,092.4 |
| Production | 1,927.7 |
| Imports | 176.0 |
| Change all stocks | +11.3 |

## Nomads' Facilities at Exposition to Be Enlarged

Arrangements have been made for a building on the grounds of the National Petroleum Exposition, to be held in Tulsa next May 15-22, which will provide ample room for all requirements of Nomads and an unusually large group of foreign visitors expected to attend, W. B. Way, exposition manager, told a meeting of the national board of regents of Nomads in Dallas, June 13.

The regents adopted constitutional amendments providing for the publication of an annual membership roster and a quarterly news bulletin.

Officers of the Dallas chapter, newest addition to the national body, were guests of the regents at a luncheon meeting. Regents and visiting Nomads were guests of the Dallas chapter at a night meeting in the Petroleum Club.

C. W. Thornhill, Thornhill-Craver Co., Houston, national chairman, presided at the meeting of regents. N. A. Endicott, Continental Supply Co., Dallas, presided at the night meeting.

Attending the regents' meeting were F. L. Senter, National Tank Co., Houston; Henry A. Bourne, Republic Steel Corp., Tulsa; H. M. Cosgrove, Southwest Supply Co., Tulsa, proxy for Shep Miers, Southwest Supply Co., Tulsa; G. A. McClelland, International Derrick & Equipment Co., Dallas; and S. S. Parker, National Tank Co., Dallas. New York and Los Angeles regents sent in voting instructions on all matters requiring official action.

## Scientists Recommend Gasification Studies

Economic studies to determine the cost and industrial importance of underground coal gasification have been recommended to the Bureau of Mines.

The recommendation was made following reports by scientists representing industry, Government, and the armed forces that the experiment by Alabama Power Co. and the Bureau of Mines at Gorgas, Ala., had surpassed expectations.

Milton H. Fies, manager of coal operations for the utility company, said at Gorgas a block of coal was isolated and set afire under controlled conditions with incendiary bombs. The coal, he said, was burned out clean without wastage.

# $26,000,000 Program to Start at Bayway

TO meet increased production demands, a $26,000,000 expansion program at the Bayway refinery of Standard Oil Co. of New Jersey will get under way shortly and is expected to be completed within the next 2 years, according to Donald F. Ferguson, New Jersey works manager of the company.

The new construction will include a 49,000-bbl. daily vacuum pipe still, a 41,000-bbl. daily Fluid catalytic cracking unit, a 260,000-lb.-per-hour steam boiler and an additional 7,500-kw. turbine generator. Offsite facilities in the program will include new sewers and water, oil, and gas lines,

A feature of the new catalytic cracking unit, a modern companion to the refinery's present 250-ft. catalytic unit, will be the use of the microspherical catalyst, a development of fluid flow in which thousands of tons of microscopic spherical particles flow as a liquid and contact hot oil vapors to produce high-octane gasoline as an adjunct to the main cracking unit. There will also be a light-ends unit.

The new pipe still, which will be constructed to operate at pressure below atmospheric conditions and will be operated in conjunction with existing atmospheric pipe stills, is designed to increase feed stock for the catalytic cracking unit.

Included in the offsite facilities is a new 60-in. salt-water line which will supply water for cooling and other processing purposes. Standard Oil Development Co. is now building an $8,000,000 laboratory project at Linden, where the Bayway refinery is located.

# Drilling Safety Manuals, Color Code Discussed at "Clinic"

DALLAS.—The 2-day Drilling Industry Accident-Prevention Clinic held June 10-11 under the sponsorship of the American Association of Oilwell Drilling Contractors, was acclaimed the association's most successful thus far and termed a "practical" meeting in every way by those in attendance. More than 110 safety engineers from oil companies, as well as drilling contractors, were present.

The first day, presided over by J. Doyle Settle, A.A.O.D.C. secretary, included a round-table discussion on safety manuals for drilling companies. Discussion was led by R. E. Dishman, safety director, Hunt Oil Co. It was decided that such manuals should be standardized, and a committee, composed of Dishman, Sam King, Kerr-McGee Oil Industries, Oklahoma City; Don Klemme, Stanolind Oil & Gas Co., Tulsa; John S. Jackson, Danciger Oil & Refining Co., Fort Worth; and Harry Markee, Phillips Petroleum Co., Bartlesville, will work with the association in its preparation. The new manual will deal with proven field practices in rotary drilling. A representative number of drillers and tool pushers in the field will be consulted before its final publication.

The subject "Accident Reporting and Procedure for Determining if Progress is Being Made in Reduction of Accidents," with discussion led by Harry Markee, was on the afternoon program. Don Walker, Noble Drilling Co., Tulsa, led discussion on "What to Look For in Making a Safety Inspection of a Drilling Rig." The objective was to work out a standard rig-inspection check sheet. W. F. Richards, safety supervisor, Shell Oil Co., Inc., Houston; R. W. Lindsey, safety director, Pacific Employers Insurance Co., Houston; and Dishman were designated as a committee for the purpose of combining desired qualities of present check sheets into one standard form.

### Company Safety Bulletins

The second's day program included a discussion on the publication of company safety bulletins, with an idea toward increasing reader interest. The afternoon session, with J. Ross Carr, Gulf Oil Corp., Odessa, Tex., presiding, included talks on safety color codes for drilling rigs. Commentary on safety devices for drilling rigs was led by W. B. McElreath, Sun Oil Co., Beaumont, Tex.

Highlight of the afternoon session was the showing of color slides by Robert P. Darney, Fort Worth, and William B. Cox, Houston, Stanolind safety supervisors. It was agreed that adoption of a safety color code for various pieces of equipment having potential hazard has a rightful place in modern drilling practices. This was clearly shown by the slides. Obstructions that could cause a man to fall into moving machinery, or release levers easily tripped, were far more noticeable by the application of color. Preceding the slides, a sound film, prepared by the du Pont company, depicted progress made by application of a safety color code in various manufacturing industries.

Color code work in the drilling industry so far has been experimental. Most drilling crews were said to be in favor of the program, but some roughnecks thought the whole idea was just "dolling up" the rig. In one instance, when the supply of paint ran out, another color was substituted because, as the rig man put it, "it was such a pretty color." However, many safety engineers said their companies were going ahead with the program on their own initiative. Cost is said to be about $75 per rig. Experiments thus far have used standard colors as set by the National Safety Council. These include "alert" orange, "fire" red, "electric" blue, and "danger" yellow.

*Shown here are five of the speakers at the 2-day Accident-Prevention Clinic held June 10-11 in Dallas by the American Association of Oilwell Drilling Contractors. They are: Harry Markee, Phillips Petroleum Co., Bartlesville; Don Walker, Noble Drilling Co., Tulsa; William B. Cox, Stanolind Oil & Gas Co., Houston; R. E. Dishman, Hunt Oil Co., Shreveport; and W. B. McElreath, Sun Oil Co., Beaumont*

# Sun Assails Government In Antitrust Brief

WASHINGTON. — A showdown on the 7-year-old "Mother Hubbard" antitrust suit against the American Petroleum Institute and all major oil companies was sought in federal court here this week by Sun Oil Co.

In a brief filed in support of oral argument, Sun accused the Justice Department of attempting to keep the company unfairly in the dark by refusal to answer Sun's interrogatories as to how it specifically violated the antitrust laws as charged in broad language against all 225 defendants. Characterizing the 1940 complaint as probably the most formidable suit of any kind ever filed in an American court, Sun said if the complaint was prepared in good faith the Government must have the information necessary for trial and if the charges were recklessly made without supporting data the Government should acknowledge the fact and reduce the case to its proper proportions.

By the nature of things all the defendants could not have committed all the offenses charged, Sun said, and to insure a fair trial and save time for the court the Government should specify who did what or else the trial will drag out for months and end in procedural chaos.

## Jersey Standard Holds Accounting Conference

Accounting representatives of Standard Oil Co. (N. J.) and its affiliates in South America, Canada, Egypt, and Hungary this week were attending a production - accounting conference in Tulsa.

One full day of the 4-day program, being held in the Mayo Hotel, was scheduled for a discussion of foreign accounting problems. The conference was scheduled to end Thursday.

# International

WORLD-WIDE OIL DEVELOPMENTS

## Russia Tightens Romania Control, Takes Credit Minier Assets

•ESTABLISHMENT of Romanian government-controlled industrial boards (actually cartels) which will handle the allocation of all raw materials and machinery, as well as the sale and payment collections of all goods produced, has been approved by the Chamber of Deputies, according to dispatches from Bucharest.

Meanwhile complete Russian domination of Romania's oil industry has been effected, the Petroleum Press Service reports. The Romanian Government has been forced to turn over to a Russian-dominated company the assets and shares of Credit Minier, the last large oil operation controlled by Romanian interests.

Private oil firms in Romania continue to go heavily into debt, largely because of government demands that the companies provide food and clothing to all employes. To do this, the companies are often forced to purchase on the black market and sell food and clothing to employes at prices far below actual costs.

As an example of the way oil companies in Romania are losing money, one representative explained that a certain amount of wheat was recently purchased for the firm's employes for 3 billion lei and sold at 170,000,000 lei, or a loss of over 2 billion lei.

### Conditions from Bad to Worse

When the World War II treaty was signed with Romania last January, reports indicated that private firms there would stand a much better chance of collecting unpaid amounts due on deliveries already made and that the generally chaotic conditions would improve. But continued Russian interference has not only prevented any improvement but has resulted in economic conditions going from bad to worse.

Shortly after Soviet troops occupied Romania, a joint Soviet-Romanian company, Sovrom Petrol, was established purportedly for the purpose of directing operations of former Nazi assets. But Russia paid little attention as to what legally constituted Nazi assets and consequently laid claim to oil property which actually belongs to nationals of the United States, Great Britain, French and Belgium.

Crude-oil production in Romania is now at about 80,000 bbl. daily, with Astra Romana (Shell) producing the largest proportion, or approximately 20,000 bbl., and Romano-Americana, subsidiary of Standard Oil Co. (N.J.) producing around 11,250 bbl. About 35 per cent of this production—which comes largely from the fields of Ceptura, Baicoi, Boldesti, and Mareni—is consumed internally, with the balance going to Russia.

Since the end of the war, Russia has transferred about 54,000 tons of tubular equipment from Romania to operations within the U.S.S.R. Romano-Americana, for example, has esimated that 70,000 tons of equipment has been "lost" to the Soviets.

## Pipe for Saudi Arabia Will Leave U. S. Soon

More than 1,000,000 tons of pipe will begin leaving West Coast ports this summer for Saudi Arabia in what is expected to be, in aggregate, the largest commercial shipment in history.

Consolidated Steel Corp.'s Maywood, Calif., plant is reported already rolling pipe which will go in the first ships. The 30 and 31-in. pipe will be used in the Trans-Arabian Pipe Line Co. project from the Persian Gulf to the Mediterranean.

Isthmian Steamship Co., subsidiary of United States Steel Corp., has contracted to move the pipe and is expected to add a number of Liberty ships to its existing cargo fleet of 80 vessels. Ships are expected to leave the United States ports every 5 or 6 days on the 120-day round trip of more than 25,000 miles.

Considerable new rail lines must be laid on West Coast piers to handle the pipe shipments.

## Poe Completes Poza Rica Survey

CONSTRUCTION in the near future of a $10,000,000 natural-gas pipe line from Poza Rica field to Mexico City, using funds from the Export-Import Bank's $50,000,000 loan for development of natural resources, now is being considered, according to E. Holley Poe, head of E. Holley Poe & Associates, utilities consultants.

Poe, former head and now director of Texas Eastern Transmission Corp., owner of the Big Inch system, has just completed a study of crude oil and natural gas production in Poza Rica.

Proposals for such a line were heard several months ago with the announcement that the Mexican Government was planning the construction of a $10,000,000 plant near Mexico City for the manufacture of nitrogenous fertilizers from natural gas.

At that time, plans called for construction of the line by Petroleos Mexicanos, government oil agency, utilization of the raw gas by the fertilizer plant, and distribution of the processed gas to industrial plants as fuel. The processed gas also would be distributed in compressed-gas cylinders to home users.

Poe, in an interview in Washington, following his tour, said present Mexican natural resources are being wasted because there are no provisions for future use, but that the fuel considerations of the industrial economy of Mexico will be enhanced substantially by the projected line.

Poza Rica, he said, has about 1.5 trillion cubic feet of natural gas, adding that "great significance should be attached to the virtual elimination of waste of natural gas in Poza Rica field as the demand in the Mexico City market is met by deliveries of the proposed line." Further conservation of gas throughout Mexico will be achieved as this and other markets justify expansion of the natural-gas service, he said.

# New Interest Shown In U. N. Conference

PROBABILITY of a United Nations international conference on resources and conservation in 1948 now seems more evident than ever since Leroy D. Stinebower, acting United States representative on the U.N.'s Economic and Social Council, has indicated that the United States will supply the initiative. That the world's petroleum resources will come in for considerable discussion appears inevitable.

The Economic and Social Council has created two regional economic commissions, the Economic Commission for Europe and the Economic Commission for Asia and the Far East. These commissions, Stinebower explained, "represent a practical method of achieving multilateral cooperation, through the United Nations, on concrete problems of reconstruction. To this joint effort, the United States attaches major importance."

In the U.N.'s Economic and Social Council, there have been suggestions that the task of such an economic commission should not be one of economic reconstruction alone but rather a combined responsibility of economic reconstruction and economic development.

In relation to the Economic Commission for Asia and the Far East, Christopher Mayhew, of the United Kingdom, said Asia did not require a restoration of prewar conditions as much as a permanent raising of its standards of living. This objective can only be reached by a wholesale modernization of agricultural and industrial methods of production and by a large expansion of industry, Mayhew said.

Dr. Charles Malik, of Lebanon, agreed with the representative from India that the commission for Asia and the Far East could not limit itself to reconstruction but must interpret the concept to include economic development. Malik told the council that the Middle East region should not be neglected and that at the apropriate time he would urge the establishment of a commission for the development of the Middle East.

This September, U. N.'s World Statistical Congress is slated to be held in Washington. "This congress," Stinebower said, "will focus the attention of the world's leading statisticians present upon the statistical activities and needs of the United Nations and specialized agencies." World oil statistics are certain to be given considerable attention.

## French April Crude Imports Show Drop

France imported 257,635 metric tons (about 1,932,263 bbl.) of crude oil in April, compared with 323,131 tons (about 2,432,483 bbl.) in March. Venezuela was the main supplier in April, with 146,320 tons, while the United States supplied 17,967 tons.

Fuel-oil imports were considerably higher in April than in March, totaling 78,142 metric tons (about 586,065 bbl.) against 61,776 tons (about 463,320 bbl.). Venezuela supplied 52,053 tons of the April total and the West Indies 20,764 tons.

France imported 11,747 metric tons of lubricating oils in April compared with 10,204 tons in March. Of the April imports, 10,006 tons came from the United States, with the remainder from the West Indies and the United Kingdom.

April's gasoline imports totaled 89,626 metric tons, against 76,587 tons in March. The United States headed the list of suppliers with 35,309 tons, closely followed by Venezuela with 30,529 tons. The United Kingdom sent 705 tons.

Gas-oil imports amounted to 34,557 metric tons compared with 26,440 tons in March. Over half of April's imports, 18,517 tons, came from the United States, while Venezuela supplied 12,428 tons, and West Indies supplied the balance.

Meanwhile, Reuters also reports from Paris that a new mixed company, consisting of the French Government and private firms, has been formed to carry on exploration and development work for minerals and oil in French Equatorial Africa. The new company reportedly has a capital of 276,406,000 francs (about $2,342,000).

# Russians Report New Inclined Drilling Method

A NEW Soviet method of drilling on an inclined plane is expected to speed development of additional, recently discovered oil in Baku fields by enabling Russian drillers to sink several wells on one site in order to reach undersea or otherwise inaccessible deposits.

The newly developed Russian method of drilling on an inclined plane is based on the use of a multistage turbodrill, according to a recent U.S.S.R. Information Bulletin. Designed to incline evenly the well in the desired direction without any interruption in the process of drilling, the method does not require repeated lowering and hoisting of special tools or the use of different sized bits.

The turbodrill is attached to the string of tools by means of a bent-spring nipple, the Russian publication said. When the turbodrill with the nipple is lowered into the well, the nipple at first straightens out, but as it is spring-driven, it presses the bit against the side of the well in the necessary direction. The well is thus smoothly drilled to the desired level, the incline being achieved gradually and evenly, it was reported.

Work on the new method was begun in 1941, when prospectors discovered oil deposits at a great depth below the Stalin district of the city of Baku. Vertical drilling was impossible since the pool lay underneath the large Krasin power station and a big apartment-house district. The American method of using special deviating tools was tried, but abandoned because of the length of time involved in completing a well and the frequent number of breakdowns, the bulletin said.

## International

WORLD-WIDE OIL DEVELOPMENTS

## Jap Government Given Oil-Products Control

A Japanese Government corporation to buy and sell oil products at fixed prices, have custody of and process oil products, distribute all petroleum products, and name all product dealers has been organized, according to the Office of International Trade, U. S. Department of Commerce.

The new organization succeeds the Wartime Petroleum Distribution Co. and is capitalized with funds borrowed from the Reconstruction Finance Bank.

Announcement of its creation coincided with the announcement in the Japanese press of the discovery of a new Japanese oil field, near Shindai village of Toyama Prefecture. Hokuriku Oil Field Development Co. was credited with the discovery.

In announcing the new Japanese Government concern, the Office of International Trade revealed that American businessmen will be authorized to enter Japan after August 15 for specified reasons.

Applications will be considered only for businessmen seeking: to purchase goods available for export or sell raw materials needed by Japan; to provide commercial services such as banking, insurance, and shipping; and to inspect commercial investment interests.

## German Exploration Planned

WASHINGTON.—Purchase of two complete seismograph outfits from the United States has been approved by the Bipartite Economic Panel in Berlin representing the administration of the British and American occupation zones in Germany. The equipment will be used in geological surveys to develop new crude-oil reserves in the combined area, according to a report of the Military Government in Germany to the War Department.

# Italian Companies Hope for Early End to Wartime Restrictions

International
WORLD-WIDE OIL DEVELOPMENTS

**by Warren W. Burns**

BY the first of July, private oil companies operating in Italy hope that most of the wartime conditions impeding normal operations, currently being directed by Comitato Italiano Petroli (C.I.P.), will be relaxed.

However, it is generally conceded that while C.I.P. may cease its direct operating functions that certain coordinating duties will be continued for an indefinite time. C.I.P. is unique in that its organization and personnel is somewhat similar to the now defunct Petroleum Administration for War in the United States, the most striking similarity being that it is run by oil men. C.I.P. originally was formed by Allied military officers and to date has accomplished much in the form of rehabilitating damaged oil installations.

Any large-scale rehabilitation work or new developments in Italy, however, are unlikely until the political situation has improved. Meanwhile, Societa Petrolifera Italiana, subsidiary of Standard Oil Co. (N. J.), has contracted with Western Geophysical Co. to put a seismograph crew to work in the Po Valley. Exploratory work here will be conducted on permits already granted. Large-scale exploratory work in Italy is handicapped by the fact that although 3-year exploratory permits may be granted, the law provides that new negotiations for a concession start only if and when oil is discovered.

### Italian Refinery Capacity

Current daily oil production in Italy is approximately 251 bbl., of which 118 bbl. comes from Vallezza field. Italy's daily refining capacity is around 12,000 bbl., exclusive of Trieste, and is expected to reach 35,500 bbl. by 1951. Estimated annual present capacity of Italian refineries is shown as follows:

Azienda Nazionale Idrogenazione Combustibili (A.N.I.C.), Bari, 260,000 tons or about 5,000 bbl. daily.

Raffineria de Napoli, subsidiary of Socony-Vacuum Oil Co., Inc., Naples, 120,000 tons or about 2,300 bbl. daily.

I.M.P.E.T., subsidiary of Royal Dutch-Shell, La Spezia, 180,000 tons or about 3,400 bbl. daily.

Standard Societa Italo Americana pel Petrolio, at Trieste, 96,000 tons or about 1,800 bbl. daily.

Azienda Generale Italiana Petroli (A.G.I.P.), Venice, 150,000 tons or 2,800 bbl. daily. In 1938, Azienda Generale had a daily rated capacity of 6,000 bbl. daily, of which 3,100 bbl. was cracked.

The accompanying table taken from Rassegna Petrolifera, shows estimated requirements for 1947 and whether the requirements will be imported or, as in the case of certain refined products, obtained domestically.

**1947 ITALIAN PETROLEUM REQUIREMENTS**

(All figures in metric tons. One metric ton equals approximately 7.6 bbl.)

| | Estimated consumption | Output from imported crude oil | Estimated import |
|---|---|---|---|
| Crude oil | ..... | ..... | 1,300,000 |
| Aviation gasoline | 35,000 | ..... | 35,000 |
| Motor gasoline | 400,000 | 370,000 | 29,200 |
| Special gasoline | 12,000 | *9,000 | ..... |
| White spirit | 12,000 | *10,000 | ..... |
| Kerosine | 170,000 | 143,980 | 26,020 |
| Gas oil | 140,000 | 200,000 | 240,000 |
| Fuel oil | 1,700,000 | 307,000 | 1,393,000 |
| Lubricating oils and greases | 105,000 | (†) | (‡) |
| Vaseline | 2,000 | (†) | (‡) |
| Paraffin | 25,000 | ..... | 25,000 |
| Bitumen | 140,000 | ..... | 140,000 |
| Coke | 30,000 | 19,400 | 10,600 |

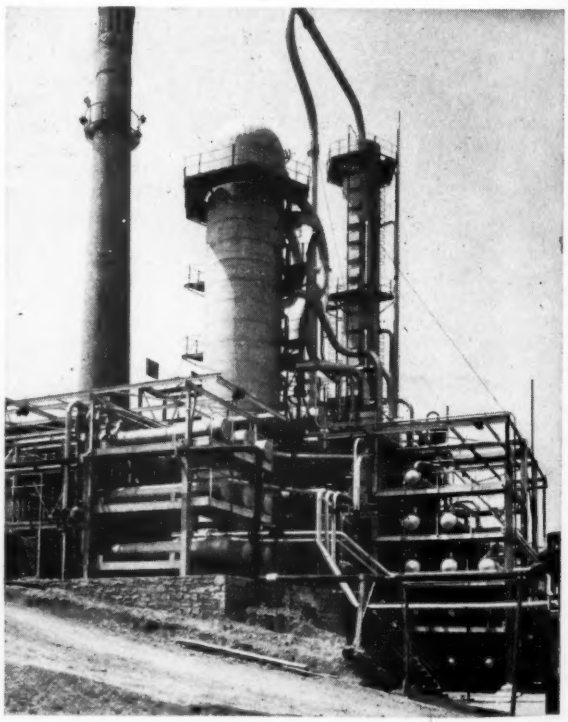
*The difference of 3,000 tons of special gasoline and 2,000 tons of white spirit should be drawn from about 8,000 tons of Italian crude oil, with additional 3,000 tons of residual products. †To be determined when characteristic of crude is shown. ‡To be determined when crude oil output is shown.

Commenting on these figures, Rassegna Petrolifera states:

"This plan foresees a consumption exceeding that estimated for the first year of war. The quantity of oil products for civil needs were then estimated on a basis of 2,250,000 tons while the figures concerning the program for 1947, in which lubricants are not included, exceed 2,750,000 tons. Nevertheless this difference is not the consequence of an increase in productive activities but of a shifting from one sector to another.

"In fact, the estimated figures concerning fuel requirements in the 1947 plan are about the same as those fixed in 1940. The corresponding figures for kerosine and lubricating oils indicate a slight increase. The difference depends upon the fuel-oil data which is 1,700,000 tons compared with 1,000,000 tons in 1940.

"This increase is explained by the difficulty in coal imports. . . . Regarding the source of these supplies, it is interesting to note the importance that the output from imported crude will have. This output is due to meet the 1947 requirements as follows: 93



*Aquila refinery in Trieste, showing vacuum fractionator and heat exchangers with the atmospheric tower in the background. This refinery suffered some war damage by bombing but has since been largely reconstructed (photo courtesy Foster-Wheeler Corp.)*

per cent for gasoline; 85 per cent for kerosine; 46 per cent for gas oil; and 18 per cent for fuel oil.

"The figures for lube oils are not available, partly because of the type of crude oil which will be imported is not known and partly because of technical conditions concerning the restoration of special plants."

It is pointed out that the above requirements estimates have been made on the basis of essential needs bearing in mind the shortage of foreign exchange. Imports of 1,300,000 tons of crude do not normally satisfy refinery capacity.

### Some Crude From Arabia

In estimating Italy's 1947 crude-oil requirements at 1,300,000 tons (about 9,100,000 bbl.), it is evident that all of this will be imported through prior purchase arrangements of the United Nations Rehabilitation and Relief Association (U.N.R.R.A.), and a large proportion of this is Saudi Arabian crude. Commenting on U.N.R.R.A. activities, Rassegna Petrolifera states "that against an expenditure of $9,000,000 for estimated import requirements of 1,300,000 tons of crude oil, Italy, by operating her own refineries, will be able to avoid expenditures amounting to $18,000,000 on imports of the corresponding quantities of refined oils. There will thus be a consequent net saving of $9,000,000 to which must be added $4,000,000 on account of U.N.R.R.A. imports of P.O.L. products."

Reports from Rome indicate that the commission set up by Comitato Interministeriale per la Ricostruzione for the purpose of examining a plan for petroleum-industry reorganization has convened under the chairmanship of the former undersecretary of state for industry.

The Aquila refinery at Trieste, which had a prewar crude-oil throughput of 5,000 bbl. daily, suffered some war damage but has now been largely restored. Current plans call for doubling this refinery's daily capacity. The products will be largely gasoline, kerosine, lubricants, and diesel oil. The storage facilities at Aquila escaped most of the bombing with the result that U.N.R.R.A. used them until recently.

### Synthetic Plants Studied

Other expansion plans—plans which may remain relatively inactive until Italy's political situation clears—for this country include construction of two Fischer-Tropsch synthetic gasoline plants at Florence. This development, however, may hinge largely upon the exploitation of nearby lignite resources.

The combined demands of Italian and Swiss sources for petroleum products has led to reports that British interests are studying plans for the construction of a 10,000-bbl. daily catalytic cracking plant to be located in Venice.

Assuming steel will be available, from either United States or European sources within the next few years, a pipe line may be constructed from Genoa to some place in Switzerland, as well as a line from Genoa to the Po Valley, the idea being to reach the Adriatic Sea without going by way of the Mediterranean.

But whatever type of construction is being planned for Italy, at least construction in which United States dollars might play a part, it is a certainty, well-informed oil circles report, that nothing much will be done until Italy decides how her government is to be run. And if it is Communist dominated, there is more than an even chance that United States oil companies will not invest a cent more than is necessary to maintain current operations.

## 5-Year Program Ahead in Middle East, Suman Says

Completion of pipe-line and refining programs and additional development work to round out Middle East oil operations into a balanced unit is probably nearly 5 years off, John R. Suman, vice president, Standard Oil Co. (N.J.), said this week in Tulsa.

Responding to queries about the effect of Middle East expansion on South American oil, particularly Venezuelan, Suman said that his company's economists had analyzed the growth of Western Hemisphere markets and were of the opinion that by the time Middle East oil is available to Europe in large quantities, there would be no difficulty in absorbing all Venezuelan and Colombian production in the Western Hemisphere.

He pointed out that such large countries as Argentina and Brazil are growing rapidly, industrializing, and increasing consumption of petroleum products at an accelerating pace. This is true also of all other countries in the Western Hemisphere outside the United States, he said.

Practices of reservoir-engineering control in the Middle East are probably a little ahead of those in the United States, he said. Large daily production per well comes from wells very widely spaced, drawing on extremely thick oil columns. As an example, he said Gach Saran field in Iran had an oil column 4,000 ft. thick, and Abqaiq in Saudi Arabia is credited with at least 1,500 ft. of oil column.

## Industry View to Be Asked On Proposed Colombian Law

Prior to making the final draft of a Colombian oil bill, which will be submitted to Congress July 20, members of Colombia's five-man National Petroleum Council will give oil-industry representatives an opportunity to discuss its provisions, according to a report from Bogota, with the petroleum minister and the council members. This bill is aimed at amending the oil statute along technical and economic lines.

The council is now taking a census of trained Colombian oil men relative to their education, experience, and membership in professional societies.

## Colon Development's May Production Shows Gain

Venezuelan crude-oil production of Colon Development Co., Ltd. (Shell), for the 5-week period ending June 2 was 476,762 bbl., or approximately 13,621 bbl. daily. This compares with Colon's 4-week production, ending April 28, of 354,311 bbl., or approximately 12,654 bbl. daily.

Colon Development, which operates petroleum concessions in Western Venezuela southwest of Lake Maracaibo, has announced that W.T. 2, a discovery well at Los Cerritos on structure 10 km. west of the Tarra anticline, has encountered oil-bearing formations from 8,810 to 9,173 ft.

The well has been completed and brought into production from this interval, flowing at the rate of 1,500 bbl. daily of 40°-gravity.

## Sixth Spring Hill Test Completed as Producer

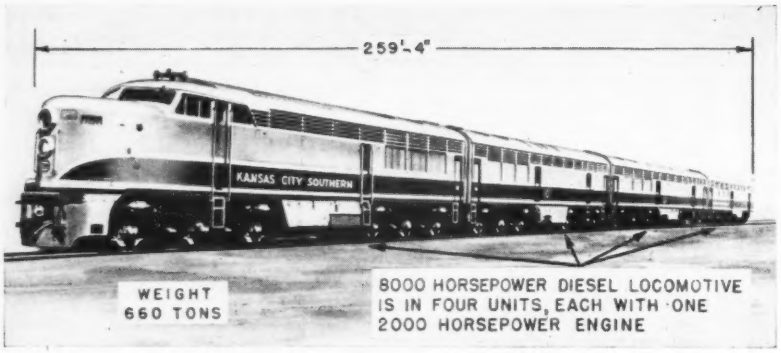
Chile's sixth test in Spring Hill field in Tierra del Fuego Archipelago has been completed as an oil producer, the New York office of the Chilean Government Oil Corp. announced June 16.

Details of the completion were not available. Plans were reported progressing for the seventh and eighth tests. Depth of the new well was reported about 7,500 ft., about the same as other successful wells in the new field.

## Peruvian Production at 34,400 Bbl. Daily

Production of crude oil in Peru for the first 3 months of this year totaled 3,104,593 bbl., or approximately 34,400 bbl. daily, according to statistics gathered by the Department of Commerce's Office of International Trade.

Peruvian production for the same period last year totaled 3,181,457 bbl., or approximately 35,300 bbl. daily. Natural-gasoline production declined from about 3,000 bbl. daily in 1946 to around 2,900 bbl. this year.




*Kansas City Southern's new four-unit diesel-electric locomotive*

# Railroad Dieselization Points to Important New Fuel Market

***by John E. Boice****

ALMOST as spectacular as the transformation of petroleum transportation to the East Coast from water to overland during the war has been the recent shift from steam to diesel-electric locomotives on American railroads. Recent news items indicate what has already taken place in the modernization of railroad motive power and a trend that will continue at least the next few years, or until such time as experiments now being conducted to adapting the gas turbine to locomotive use prove a satisfactory substitute.

### Locomotives Owned—Number and Kind

From statistics published by the Interstate Commerce Commission's Bureau of Transport Economics and Statistics, an analysis has been made to determine what effect the displacement of coal-burning locomotives with diesel-electric engines will have on the petroleum industry.

Table 1 shows all types of locomotives of Class 1 steam railways in service at the close of each year from 1935 to 1945, inclusive. A Class 1 railroad is one having an annual revenue above $1,000,000. There are 130 operating companies in the Class 1 group, and since they operate approximately 95 per cent of all road mileage in the United States, statistics pertaining to these larger systems are hereinafter relied upon.

It will be observed Class 1 railroads owned 45,614 steam locomotives in 1935 whereas the number had declined to 38,853 at the end of 1945, a decrease of 6,761. On the other hand, diesel-electric locomotives rose from 113 to 3,816, a gain of 3,703, between the same years.

Coal-burning locomotives have actually declined 7,050 during the 11 years, while oil-burning engines show an increase since 1942. In 1935 there were 6,632 oil-burning locomotives but they diminished gradually to 6,338 in 1940 and thereafter rose rapidly to 6,921 by the end of 1945.

### Locomotive Types January 1, 1947

Locomotive deliveries in 1946 were again predominantly diesel-electrics. According to figures released by the association of American Railroads, Class 1 carriers had on their lines as of January 1, 1947, 37,255 steam locomotives, 830 electric, and 4,516 diesel units, owned and leased. The accompanying Table 2 shows the geographical location of the 4,516 diesel-electric locomotives and the service they were performing.

The railroads operating in the heavy coal-producing Pocahontas district owned no diesel-electric locomotives on January 1, 1947.

During the first 3 months of 1947, Class 1 railroads put 220 new locomotives in service, of which 24 were steam and 196 diesel-electric. New locomotives installed in the same period in 1946 totaled only 31, of which 20 were steam and 11 diesel electrics.

As of April 1, 1947, Class 1 railroads had 640 locomotives on order including 52 steam, 6 electric, and 582 diesel electrics. On the same day in 1946, Class 1 railroads had only 494 locomotives on order, of which 82 were steam, 6 electric and 406 diesel electrics.

### Complete Dieselization for Some

As further indication of what may be expected in 1947, C. R. Osborn, vice president of General Motors Corp. and general manager of its electro-motive division, stated in an address in Chicago January 24 that many railroads are headed toward complete dieselization and others will dieselize most of their divisions. Osborn asserted that some railroads have reduced fuel costs as much as 60 per cent, while maintenance costs on motive power have decreased more than 50 per cent since they shifted from steam locomotives to diesels. He further pointed out that roads operating diesels were averaging 24 to 30 miles per hour in freight-train movements compared with the normal average of 17 with steam operated freight trains. This increased efficiency Osborn attributed to availability, reliability, and economy of the more modern diesel engine.

Another indication of the upward trend in dieselization of American railroads is the statement by Robert B. McColl, president of American Locomotive Co., in New York January 27 that 95 per cent of all new locomotive orders were for diesel electrics. McColl stated the switch from coal to oil had been much more rapid than the locomotive industry had expected.

As of today almost every important railroad system in this country has diesel-electric engines in use, and some of the larger carriers have fleets of several hundred.

### Reasons for Change

There are many factors responsible for the shift from coal to oil for fueling locomotives. Primarily it is modernization and the necessity of re-

**TABLE 1—LOCOMOTIVES OF CLASS 1 LINE-HAUL RAILWAYS**

| Year ended Dec. 31 | Steam | Electric | Diesel electric | Other |
|---|---|---|---|---|
| 1935 | 45,614 | 842 | 113 | 25 |
| 1936 | 44,162 | 817 | 143 | 24 |
| 1937 | 43,624 | 818 | 218 | 23 |
| 1938 | 42,637 | 829 | 314 | 30 |
| 1939 | 41,117 | 843 | 510 | 41 |
| 1940 | 40,041 | 858 | 797 | 25 |
| 1941 | 39,624 | 857 | 1,267 | 23 |
| 1942 | 39,491 | 855 | 1,667 | 20 |
| 1943 | 39,725 | 868 | 2,125 | 13 |
| 1944 | 39,681 | 863 | 3,049 | 19 |
| 1945 | 38,853 | 842 | 3,816 | *19 |

*Represents 13 gas-electric, 5 gasoline, and 1 diesel-motor locomotive units.

*Valuation analyst, Interstate Commerce Commission; formerly senior transportation engineer, Petroleum Administration for War.

placing many old engines that now require heavy maintenance expenditures. Experience has demonstrated it is more economical to salvage old-type coal-burning locomotives and replace them with modern high-speed diesel-electric engines. This is especially wise because of the high scrap value now obtainable. Labor troubles in the coal mines are another chief reason for the transition in motive power. Still another factor in the shift to diesel electrics is because they show important operating economies if kept moving. This is obvious, as new motive power is certainly more efficient than old and the oil electrics having largely been installed since 1938 have thus far required little time out for repairs.

The normal service life of a steam locomotive is 30 years. A total of 17,878 engines had outlived their normal life expectancy at the end of 1945, while roughly speaking 14,000 had average ages between 21 and 30 years. Only approximately 18 per cent of the steam locomotives in use on December 31, 1945, were built subsequent to January 1, 1925. It might be mentioned that while only 115 new steam locomotives were added during the year 1945, a total of 978 steam engines were permanently retired due to sale or demolition.

The shift to diesel-electric engines does not mean coal burners will become extinct. On the contrary the old "iron horses" will be around for years to come and those remaining will be of the more recent design and will render efficient service. Old-timers point with pride to the fact that steam locomotives are still today, as in the past, pulling by far the majority of the freight tonnage. The steam locomotive, however, has been forced to give much ground since the inauguration of present-day streamlined passenger trains.

### Diesels Comparatively New

Of the 3,816 diesel electrics in use at the end of 1945, a total of 3,010 units, or about 79 per cent, were built subsequent to 1940. Only 93 of this class of motive power were at that time more than 10 years old.

Statement No. M-240 circulated by the I.C.C. shows that from 162 monthly reports representing 170 steam railways (Class 1 switching and terminal companies included), 6,202 locomotives were unserviceable at the end of February 1947. It naturally may be assumed that many retirements will be made shortly.

### Advantages of Diesel Electrics

Initially diesel-electric locomotives were used for switching service and the majority of those presently operated are in that same service. It was not until 1935 that diesel electrics were recognized as being adaptable to passenger service and 1939 to power freight trains. The first diesel electrics were of relatively small horsepower but today most orders for new units are 1,000 and 1,500 hp. with some in the 3,000-hp. range. Multiple-unit operation is not uncommon. The Kansas City Southern, for instance, recently received an 8,000-hp. diesel-electric road locomotive for handling lengthy freight trains over heavy grades consisting of four 2,000-hp. units coupled together for multiple-unit operation from an engineman's cab in either end (see cut). These engines may be combined for operation as a single locomotive or split into two-unit 4,000-hp. locomotives dependent upon service requirements. A conventional type 4,000-hp. diesel-electric passenger engine is equipped with tankage capacity of 2,400 gal. diesel oil and 560 gal. lubricating oil.

### Diesel Economy

The real advantages of diesel-electric motive power so far have been lower per-mile cost, higher utilization, and high-speed hauling capacity with a resultant distinct economy when considered on the cost per gross ton-mile basis. Diesel-electric engines are performing approximately 9 per cent of the total locomotive mileage in all service. For passenger service alone the percentage is over 12.

The steam locomotive has always jerked and pounded its way along the track, and the impact has proved detrimental to alignment thus necessitating considerable maintenance by section gangs. Diesel-electric engines, on the other hand, are smoother riding, cleaner, and the powerful new freight and passenger units used in road service turn out more horsepower per unit of fuel than the steam engines of 20 years ago.

Diesel electrics require less time in shops for repairs than steam locomotives. Electrical equipment can be replaced if need be in a short period of time, and the diesel engines are kept in almost constant efficient condition.

Those railroads that eventually become wholly dieselized will be able to abandon costly coal and water supply facilities thus further reducing operating and maintenance costs. New repair shop facilities, however, may offset this saving to some extent.

There are many outstanding operating performances by the diesel-electric engines that have been in service a sufficient length of time to judge their efficiency. Manufacturers are keeping historical records on the diesel-electric units they have built, and statistics show these locomotives have performed at a remarkably low-cost operation and maintenance with an availability of more than 95 per cent.

### Railroad Fuel Consumption and Purchases

In 1918 the railroads were using 30.6 per cent of the nation's entire consumption of bituminous coal. Since

**TABLE 2—DIESEL-ELECTRIC LOCOMOTIVES BY LOCATION**

| District— | Passenger | Freight | Passenger or freight | Switching | Total |
|---|---|---|---|---|---|
| Eastern | 41 | 165 | 70 | 672 | 948 |
| Allegheny | 47 | 44 | .... | 279 | 370 |
| Southern | 196 | 212 | 12 | 343 | 763 |
| Northwestern | 48 | 182 | 55 | 440 | 725 |
| Central Western | 225 | 539 | .... | 699 | 1,463 |
| Southwestern | 14 | 58 | .... | 175 | 247 |
| Total, all districts | 571 | 1,200 | 137 | 2,608 | 4,516 |

**TABLE 3—FUEL CONSUMPTION AND COSTS, 169 STEAM RAILWAYS**

| | Coal (net tons) | Fuel oil (gal.) | Diesel oil (gal.) |
|---|---|---|---|
| 1946 consumed | 100,639,874 | 3,848,134,150 | 519,810,365 |
| 1945 consumed | 115,049,337 | 4,379,241,545 | 418,841,082 |
| 1945 total cost | $382,990,536 | $113,453,283 | $29,772,743 |
| 1945 total cost | 397,523,784 | 115,194,575 | 23,145,376 |
| 1946 unit cost* | $3.81 | $1.24 (bbl.) | 5.70c |
| 1945 unit cost | 3.46 | 1.10 (bbl.) | 5.49c |

*Includes freight and handling expenses.

**TABLE 4—FUEL RECEIVED AND AVERAGE UNIT COST CLASS 1 LINE-HAUL RAILWAYS**

| | Bituminous coal | | Fuel oil | | Diesel oil | | Gasoline | |
|---|---|---|---|---|---|---|---|---|
| Year ended Dec. 31— | Quantity (tons) | Cost per ton* | Quantity (1,000 gal.) | Cost (cents/ gal.)* | Quantity (1,000 gal.) | Cost (cents/ gal.)* | Quantity (1,000 gal.) | Cost (cents/ gal.)* |
| 1935 | 81,286,385 | $2.23 | 2,281,546 | 1.900 | Not available | | 40,276 | 7.811 |
| 1936 | 91,706,723 | 2.23 | 2,568,960 | 2.099 | Not available | | 44,863 | 8.333 |
| 1937 | 91,718,059 | 2.34 | 2,874,799 | 2.345 | Not available | | 47,004 | 8.813 |
| 1938 | 74,783,697 | 2.36 | 2,425,819 | 2.214 | Not available | | 46,265 | 8.034 |
| 1939 | 81,812,613 | 2.37 | 2,573,298 | 2.012 | 43,898 | 4.395 | 45,714 | 7.972 |
| 1940 | 88,595,490 | 2.32 | 2,751,809 | 2.020 | 72,874 | 4.480 | 46,258 | 8.109 |
| 1941 | 104,099,613 | 2.48 | 3,368,177 | 2.151 | 114,080 | 4.516 | 47,141 | 9.115 |
| 1942 | 120,910,135 | 2.59 | 4,134,764 | 2.213 | 174,353 | 5.049 | 46,473 | 10.135 |
| 1943 | 129,738,453 | 2.94 | 4,802,297 | 2.635 | 218,846 | 5.270 | 44,904 | 10.736 |
| 1944 | 135,579,265 | 3.13 | 4,743,808 | 2.632 | 315,831 | 5.353 | 45,845 | 11.016 |
| 1945 | 123,006,960 | 3.25 | 4,705,723 | 2.612 | 441,484 | 5.213 | 46,101 | 10.913 |

*Includes transportation charges paid foreign lines, that is, a connecting line or one reached through a connecting line.

1920 the tonnage of coal used by the railroads steam engines has generally been on a downward trend during the prewar years. Conversely, since 1917 fuel and diesel oil used for train propulsion shows a steady increase.

In 1918 coal accounted for 93 per cent of the total fuel used for steam locomotives (90.6 per cent bituminous and 2.4 per cent anthracite) while the remaining 7 per cent consisted almost wholly of fuel oil. By 1945 coal accounted for only approximately 80 per cent of the total fuel used for steam locomotives while fuel oil provided the remaining 20 per cent. The use of anthracite coal as fuel for steam locomotives had practically been eliminated by 1945.

The large volume of fuel consumed during the years 1942 to 1945 (indicated in Table 4) represent abnormal conditions during the war when all types of motive power were kept in almost constant service to handle the enormous traffic. The more recent situation can best be summed up by what happened in 1946 compared with 1945, based on figures appearing in I.C.C. Statement No. M-230 compiled from 161 monthly reports received from 169 steam railways, including switching and terminal lines (Table 3).

The decrease in use of coal and fuel oil during 1946 can be attributed to a decline of about 12 per cent in operating revenues caused by the termination of the war and industrial strikes. The rapidity with which diesel-electric engines were being placed in service, however, resulted in increasing the demands for diesel oil.

Table 4 shows fuel purchases and average unit cost by Class 1 line-haul railways from 1935 to 1945.

Fuel purchases naturally follow the trend of consumption although there is some lag between the time fuel is received and time it is used because of the necessity of maintaining adequate stocks on hand. The unit cost of all fuels has been upward in recent years due partly to increased freight rates and handling charges. The cost of bituminous coal increased 70 per cent between 1935 and 1946 whereas fuel oil advanced 55.4 per cent and diesel oil only 30.4 per cent.

While only partial figures are available, it can be stated without hesitation that the railroads will consume more diesel oil in 1947 than was used during any preceding year. Purchases of diesel oil during January and February 1947 were in excess of 114,700,000 gal., compared with only 85,600,000 gal. for the same months of 1946. The total cost of the 1947 purchases for the two months was slightly more than $7,100,000.

The shift by the railroads from coal to oil for fuel is a move of outstanding importance to the oil industry. It is true that the volume of diesel oil now used for railroad motive power fuel is small compared to total sales of petroleum products, but demands will expand tremendously during the postwar period as more and more new diesel-electric engines are built. Competition among oil companies will be keen to provide the oil required to keep these modern engines rolling.

# A.C.S. Oil Group to Hear 21 Papers

TWENTY-ONE technical papers dealing with a variety of subjects of interest to the petroleum industry will be presented in three separate sessions on petroleum chemistry at the fifteenth Midwest regional meeting of the American Chemical Society in Kansas City, June 23-25.

The petroleum-chemistry sessions in the Hotel President begin Monday afternoon following a general session Monday morning. The program for the petroleum-chemistry group follows:

**Monday, June 23**

**2 p.m.**—R. L. Huntington, chairman, introductory remarks; "Chemical Treatment of Drilling Muds Contaminated with Cement," R. W. Jones, Stanolind Oil & Gas Co., Tulsa; "The Use of Wetting Agents in Conjunction with Acid Inhibitors," P. H. Cardwell and L. H. Eilers, Dowell Incorporated, Tulsa; "Composition of Petroleum: Hydrocarbon Type Analyses of 10 Distillates Boiling Between 100° and 600° F.," W. C. Holliman and H. M. Smith, Bureau of Mines, Bartlesville, Okla.; "Superfractionation Study: Naphtha from Santa Barbara, Venezuela, Crude Oil," F. G. Schwartz, Bartlesville, R. M. Gooding, Washington, and B. H. Eccleston, Bartlesville, all of Bureau of Mines.

**Tuesday, June 24**

**9 a.m.**—"The Relation of Motor-Fuel Sensitivity and Tetraethyl Lead Susceptibility to Road Antiknock Performance," T. H. Risk, Jane F. Jordan, M. L. Alspaugh, and J. D. Fuller, Ethyl Corp., Detroit; "Fuel Volatility and Distribution," Charles H. Prien, University of Colorado, Boulder, and Norman A. Parker, University of Illinois, Champaign-Urbana; "Local Operation and Maintenance Groups: Their Objectives and Functions," G. Wade and B. H. Eccleston, Bureau of Mines, Bartlesville; "Ignition Qualities of Hydrocarbons in the Diesel-Fuel Range," A. D. Puckett, Bartlesville, and B. H. Caudle, Dallas, both of Bureau of Mines; "Color Contamination of Petroleum Products Transported by Pipe Line," L. V. Sorg and R. E. Dickey, Standard Oil Co. (Ind.), Kansas City, Mo.; "Special Applications of Absorption Spectroscopy," F. W. Crawford and C. K. Buell, Phillips Petroleum Co., Bartlesville; "Cryoscopic Method for Determining Purity of Dicyclopentadiene Concentrates," Gardner C. Ray, Phillips Petroleum Co., Bartlesville; "Determination of Water in Alkylation Sulfuric Acid," William H. Goff, Walter Scott Palmer, and Roland F. Huhndorff, The Texas Co., Port Arthur, Tex.; "Viscosity Function for Petroleum Products," Theodore Groening, L. C. Krchma, and H. G. Nevitt, Socony-Vacuum Oil Co., Inc., Kansas City, Mo.; "Petroleum: A. Basic Raw Material of the Surface-Coatings Industry," Robert F. Ruthruff, Sherwin-Williams Co., Chicago.

**Wednesday, June 25**

**9 a.m.**—"Manufacture of Synthetic Gasoline," Scott W. Walker, Stanolind Oil & Gas Co., Tulsa; "Alumina Cracking Catalysts," V. M. Stowe, E. E. Marshall, L. L. Nickel, and R. S. Greenwood, Aluminum Research Laboratories, East St. Louis, Ill.; "Catalytic Desulfurization and Reforming of Naphthas Over Bauxite," G. M. Brooner and C. J. Helmers, Phillips Petroleum Co., Bartlesville; "The Refining of South American Crudes," Davis Read and Gustav Egloff, Universal Oil Products Co., Chicago; "The Petroleum and Agricultural Industries," Gustav Egloff, Universal Oil Products; "Construction and Operation of a Pilot-Size Continuous Still," C. C. Ward and F. G. Schwartz, Bureau of Mines, Bartlesville; "The Effect of Oil on the Plastic Properties of Petroleum Wax and Development of Plasticity Tests," W. L. Nelson and L. D. Stewart, University of Tulsa.

# Rocky Mountain A.P.I. District Meets June 25

DISCUSSIONS of unit operations and secondary recovery in the Rocky Mountain region comprise the technical phases of the program for the 1-day meeting of the reactivated Rocky Mountain district, American Petroleum Institute, Division of Production, to be held June 25 in the Mammoth Hotel, Yellowstone National Park, Wyo.

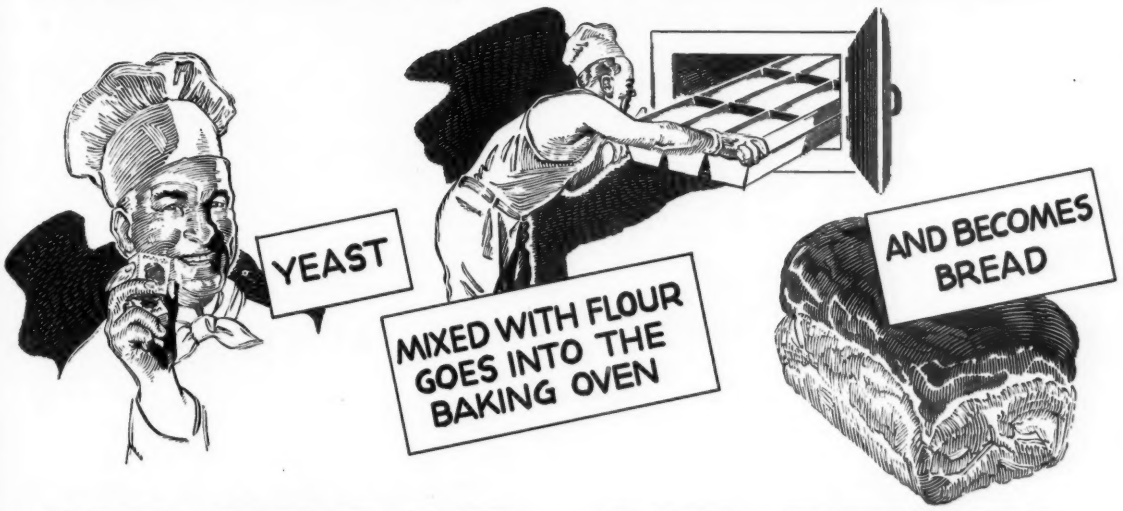
The A.P.I. production meeting will be followed June 26 by a 2-day session of the board of directors of the Rocky Mountain Oil and Gas Association. Headquarters for this meeting is the Canyon Hotel, Yellowstone Park.

For the A.P.I. meeting, the morning will be devoted to a round-table discussion of the district topical committee on drilling practice with H. A. Stewart, The Texas Co., Denver, presiding.

The afternoon session with James D. Anderson, Ohio Oil Co., Casper, Wyo., presiding, consists of: "Scope and Accomplishments of the A.P.I. Division of Production," Jake L. Hamon, Dallas, vice president, A.P.I. Division of Production; "Some Phases of Unit Operations," J. F. Cullen, Stanolind Oil & Gas Co., Casper; "Secondary Recovery in the Rocky Mountain Region," Nat A. Slagter, Lance Creek Unit, Lance Creek, Wyo. discussion "National Aspects of Secondary Recovery," by Paul D. Torrey, national chairman, A.P.I. standing subcommittee on secondary-recovery methods discussion of organization plans in the Rocky Mountain district, followed by election of officers.

Present chairman of the district is R. B. Curran, Carter Oil Co., Billings. Chairman of the general arrangements committee for the meeting is J. H. Barnett, Stanolind Oil & Gas Co., Casper; head of the program committee is James D. Anderson, Ohio Oil Co., Casper.

# NO YEAST - *NO BREAD*

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REMEMBER this--It requires large quantities of scrap to produce each ton of prime new steel. So to increase the possibility of making more steel available, turn in your scrap through your regular channels. Do it now! Keep it coming!

# WASHINGTON WATCHING

BY HENRY D. RALPH

## The Interstate Case

WASHINGTON. — The Supreme Court's decision in the Interstate Gas Co. case *(see page 56)* gives the Federal Power Commission more authority than it has yet sought to exercise over producers and gatherers selling natural gas for interstate movement, an intensifies the industry's demand for congressional amendment of the Natural Gas Act.

The industry as a whole was alarmed not so much at what FPC did in this case as at the implications for future jurisdiction contained in the opinion of the commission and of the Circuit Court in upholding it. Now the Supreme Court has resolved all doubts in favor of FPC.

The high court said it was not impressed with the argument that the trunk lines compressed the gas to line pressure after purchase, saying this was but an incident in interstate commerce rather than its origin and that the entire movement of the gas was a continuous process without interruption and so its sale was subject to FPC regulation. The case did not hinge on the question of arm's-length transaction, for the FPC finding that seller and one purchaser were affiliated was mentioned by the court only in a footnote. Nor did the court find it necessary to make any definition of the physical operations of production and gathering.

The purport of this decision is that whenever natural gas is sold for movement in interstate commerce, its price is subject to regulation by FPC and that the only restraint on FPC is to refrain from interfering with conservation or other purely local affairs of the states. This is greater jurisdiction than FPC has ever claimed for itself.

## Oil Materials Supply

THE recommendations of the NPC materials committee (see page 57) may come in for some sharp debate when the National Petroleum Council meets July 10, because of the endorsement of higher exports for foreign petroleum operations of American companies.

Independent operators have been protesting exports of oil-industry steel products in view of the shortage in domestic operations, and the committee's report is subject to misinterpretation because of the way in which the Government's export-control system operates. Actually the committee opposes large exports of steel for purposes other than rehabilitating and expanding the foreign operations of American companies, arguing that foreign oil is currently needed to relieve the unprecedented demand on domestic sources. These, it says, should be favored by more exports than are currently permitted.

The committee is highly critical of delays and red tape in the export-license system, and particularly of the preference given foreign governments and oil operations in areas where United States companies have no interest.

The report indicates that the oil industry is getting its fair proportion of the steel being produced but is short of steel because the demand for petroleum is far above expectations, and that capacity for producing tubular goods is adequate and could turn out 15 per cent greater quantities if there are no shutdowns caused by labor difficulties or lack of supplies.

## Approaching Tanker Crisis

ADMINISTRATION leaders are still clinging to an almost desperate hope that Congress will do something before June 30 to permit the Maritime Commission to continue to operate oil tankers in foreign and domestic service through general-agency agreements.

As much pressure as possible has been put on congressional leaders, but the bottlenecks are the House and Senate committees on merchant marine. The Senate committee took up the subject late last week but decided to await House action. The House committee has been holding hearings off and on for several weeks but has appeared extremely cool to the proposal.

Last week the administration brought its big guns to bear on the House group in the persons of Secretory of State George C. Marshall and Under Secretary William L. Clayton, who insisted that European relief and rehabilitation are completely dependent on the continued operation of tankers and dry-cargo vessels beyond the June 30 dead line of present authority. Clayton particularly stressed the need for tankers, saying that the government-operated fleet is about one-quarter the tanker tonnage of the world. American flag tankers plus those owned by Americans but under foreign registry, if diverted to domestic service, probably could take care of American oil needs, Clayton said, but the rest of the world would then have but two-thirds the needed tonnage.

Clayton revealed that the Navy has recently consented to the sale of 35 T-2 tankers for foreign operation and may release more, in addition to 50 now in the process of sale, and that 150 tankers are being constructed abroad. When these operations are completed, he said, there will be less need for continuing government operation, but he insisted that it is short-range matter of the greatest importance.

Committee members appeared astonished at the seriousness of the situation, but not sufficiently so to take immediate action.

## Gas Interconnections

NATURAL-GAS shortages in the midwestern consuming area are accelerating a trend toward interconnection of systems which is being watched with interest by the Federal Power Commission and others concerned with long-range views of the industry.

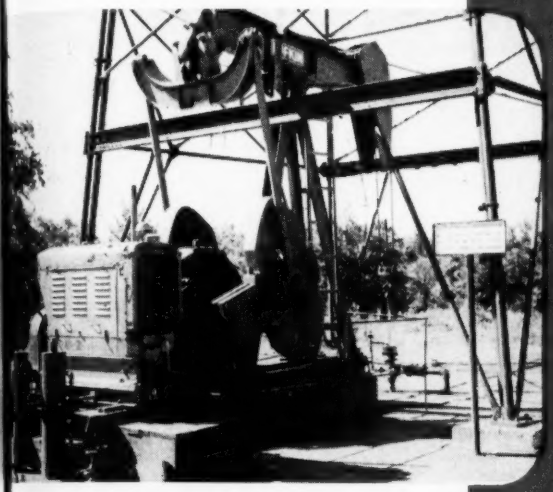
Time was when each big natural-gas system was pretty much a world unto itself, but now the trend is toward interdependence, as connecting links are being built for the exchange of gas among trunk lines and companies. Such connections permit diversion of gas to shortage areas in times of emergency, but they may become a permanent part of the pattern of gas distribution. In time the gas trunk lines of large sections of the country may resemble the "grid" system of electric-power interconnections.

The first big project of this kind came through war necessity, when the Tennessee Gas & Transmission line was built to the Upper Ohio Valley to feed several distribution systems in that area. More recently the Big Inch pipe lines have been hooked up to older lines serving the Great Lakes and Appalachian areas, with the Federal Power Commission allocating the deliveries and exchanges required for equitable distribution. Ralph K. Davies is sponsoring a project to build a new line from the Texas Gulf Coast to the Upper Mississippi Valley region for the sole purpose of connecting with a dozen or so existing lines. Only last week FPC authorized four affiliates of the Columbia Gas & Electric system to construct elaborate interconnections and rearrangements to provide more flexible and efficient distribution.

Formation of a real network of nat-

# 5 Sizes OF ALLIS-CHALMERS POWER UNITS to fit the Job....

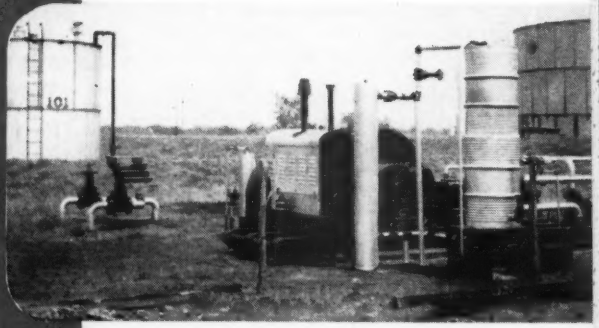
Two A-C Model L Engines with 844 cu. in. piston displacement, 590 ft. lbs. torque, at 650 r.p.m., driving rotary table, draw-works and mud pump.



An A-C Model U Engine with 318 cu. in. piston displacement, 200 ft. lbs. torque at 900 r.p.m., on a heavy duty pumping unit producing a deep well.

Model B with 125 cu. in. piston displacement, 87 ft. lbs. torque, at 1,100 r.p.m., A-C Power Engine unit on a Tonkawa field well.

Two A-C Model W Engines with 201 cu. in. piston displacement, 128 ft. lbs. torque at 1,100 r.p.m., connected with manifold driving mud pumps.



A Model E Engine with 563 cu. in. piston displacement, 400 ft. lbs. torque at 650 r.p.m., burning natural gas, hooked to a reciprocating oil line pump.

FRED E. Cooper

Hale Station, TULSA, OKLAHOMA

PHONE [illegible] BOX 1890

BRANCH—11210 So. Alameda, Lynwood . . . Los Angeles

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ural-gas mains would mean more markets for gas producers and more dependable service for consumers; it might also bring more opportunity for federal regulation of the industry.

### Price Investigation

A GRAND-JURY investigation of increased gasoline prices in the Rocky Mountain and Pacific Coast areas is the answer of the Department of Justice to numerous complaints and also is a step in piecemeal trial of the omnibus "Mother Hubbard" A.P.I. case.

The department announced last week that a grand jury sitting in Los Angeles would look into the fact that gasoline price increases were made simultaneously and in identical amounts by competing oil companies The FBI has been investigating for some weeks, and the grand jury is to examine the price practices of the companies with a view to bringing an indictment for conspiracy in restraint of trade in violation of the antitrust laws.

Among those complaining to the department about last spring's price increases were Sen. Henry Dworshak of Idaho and Gov. Earl Warren of California, the latter being engaged in a fight with oil companies over gasoline tax legislation. The grand-jury procedure is something of a departure from the more frequent method of filing civil suits, but department officials say that a straight price-fixing charge is usually treated as a criminal offense.

Apparently the department intends to use this as a test case in its campaign against "follow - the - leader" marketing practices. This was one of the chief complaints in the 1940 civil case against A.P.I. and all major companies. There it was charged that the defendants concertedly cause a selected company to post agreed-upon prices for petroleum products in a designated area and that other companies agree to follow the prices so set.

Oil companies have asked how long a marketer could remain in business without meeting the prices of a large competitor. The department has given no answer except to say that when price changes are simultaneous and identical it looks suspiciously like illegal collusion.

### Ratification Prospects

A REAL effort to salvage the badly battered Anglo-American petroleum treaty apparently is being made by Chairman Vandenberg and a few of his colleagues on the Senate foreign relations committee.

While sympathetic with most of the critics during the hearings they attempted to separate vague fears of some future agreement from actual textual shortcomings of the draft before them. Vandenberg has indicated his acceptance of the A.P.I. reservations and has drafted two amendments designed to meet criticisms of independent producers. Both, he said, should go into the treaty text and be accepted by the British, and he is open to any further suggestions for making the treaty state what its advocates say it means.

The chairman has also asked that those opponents scheduled to appear at later hearings direct their remarks toward a treaty incorporating the proposed changes and reservations, rather than go over old ground. This indicates that he hopes a large share of the opposition can be dissolved.

However, chances for ratification at this session are still not good. Even if it should feel impelled to quick action, which is unlikely, the committee could scarcely report the treaty before July 1 and the Senate has a crowded calendar to go through before the summer recess which is tentatively scheduled to start a month later.

### OGD Appropriations

AN appropriation of $155,390 to keep the Oil and Gas Division going another year was recommended by the Senate appropriations committee in reporting the Interior Department appropriation bill.

The committee also recommended an increase in the funds for enforcement of the Connally Hot Oil Act, so that total funds for OGD would be $200,730 more than the amount approved by the House.

Whereas the House committee eliminated the OGD on the ground that it was not specifically authorized by law, the Senate committee justified the appropriation in this language: "For expenses necessary for coordinating and unifying policies and administration of federal activities relative to oil, gas, and synthetic fuels, including cooperation with the petroleum industry and state authorities in the production, processing and utilization of petroleum and petroleum products, natural gas, and synthetic fuels, and the compilation of technical reports thereon."

For the current fiscal year OGD has had $425,000. The Budget Bureau recommended $241,915 for the Connally Act and $221,985 for other activities, a total of $463,900. As the bill passed the House it carried only $124,250, all for the Connally Act. The Senate committee has now recommended $169,340 for the Connally Act and $155,390 for other activities.

If these amounts are finally enacted they will permit OGD to carry on with a restricted program.

The Senate committee also recommended substantial increases over the House bill in funds for the Bureau of Land Management for leasing and administration of the public domain; for the Bureau of Mines for oil and gas investigations and economics of mineral industries; and for the U. S. Geological Survey for classification of lands, production of maps, and supervision of minerals on public lands.

## Murray Discloses Plan For Greater Recovery

HOUSTON. — William J. Murray, Jr., Texas Railroad Commission member, June 14 disclosed plans which the commission hopes to put into effect in an effort to save an estimated 7¼ billion barrels of the state's known reserves. The proposed program, which will have to wait for action until the 1949 legislature convenes, includes:

A greatly expanded research program at the University of Texas, covering special conservation research projects relating to oil and gas recovery, suggested by the commission.

Employment of additional engineers, to bring together operators in each field for conservation purposes and to enforce commission orders in the field. The present staff of 23 engineers is said to be entirely inadequate. Salaries would be raised to allow the commission to compete with private industry in obtaining and holding good engineers.

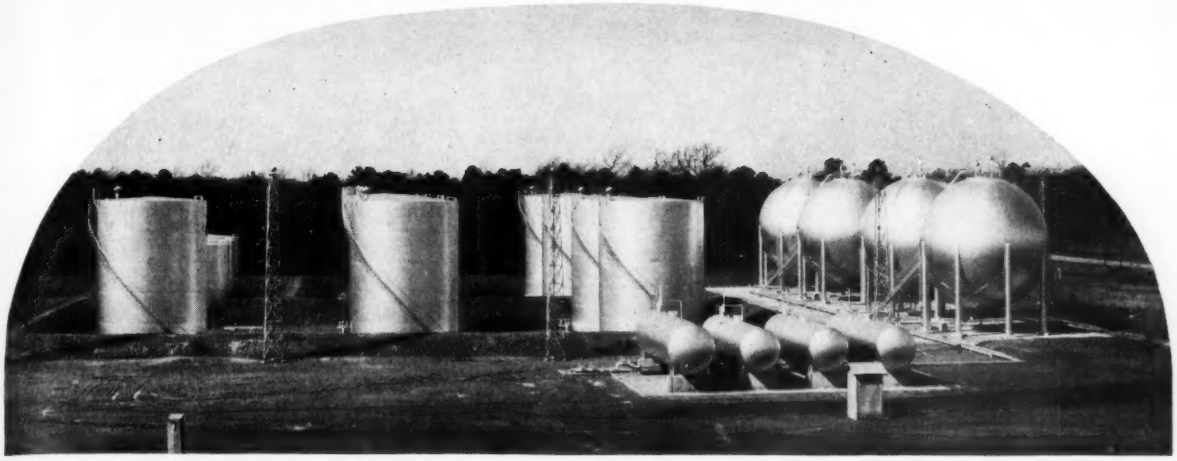
Murray said that if the commission had enough engineers to put into the fields to coordinate and enforce efficient production methods, recovery would be increased 10 per cent. He cited East Texas field as an example of what could be done through more efficient production methods, and Yates field in West Texas, which is known to be leaking oil around casing to other sands, as an example of oil lost to future recovery.

## Sunray Wildcat Successful

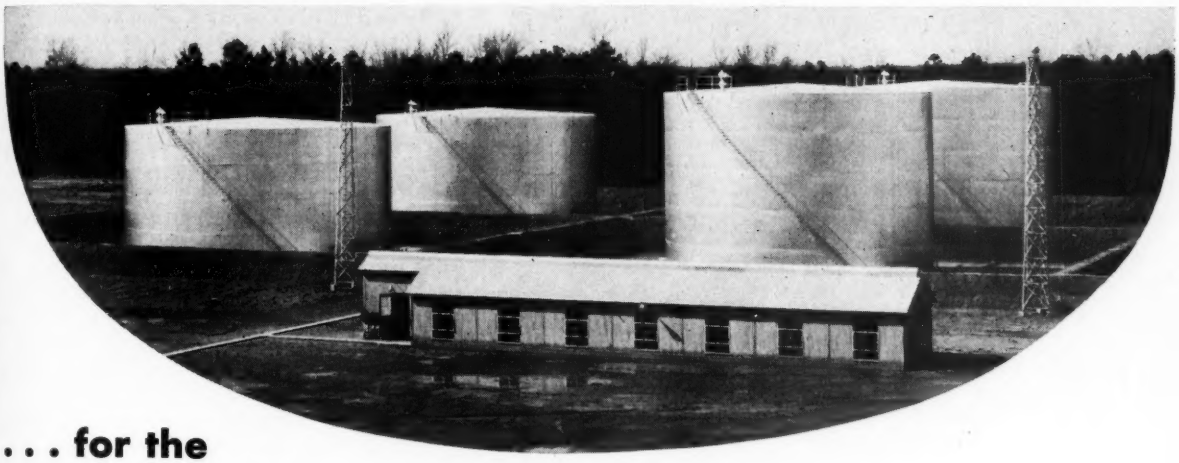
Sunray Oil Corp. has successfully completed a wildcat test in Santa Barbara County, California. The well is rated a 400-bbl. daily producer from a Miocene section at a depth of 4,830 ft. The oil is 33° A.P.I. gravity. The well is located about 12 miles south of the Sunray refinery at Santa Maria.

## Indiana Standard Project

WASHINGTON.—The Office of the Housing Expediter has approved, on grounds of negligible impact on the veterans' housing program, a $589,075 project of Standard Oil Co. (Ind.) of rehabilitation of the company's eight-story office building, 910 South Michigan Avenue, Chicago. Also approved was a $34,175 building for products sale to be built in Canton, Ohio, by Standard Oil Co. (Ohio).



# HORTON steel plate structures



## . . . for the Carthage Field

Several distinctly different types of Horton steel storage tanks for different types of service are located at absorption plants in the Carthage gas field in East Texas. The above photos, which illustrate some of these tanks, were taken at the Chicago Corporation's gasoline plant. They show nine 5,000-bbl. cone roof tanks 30 ft. in diam. by 40 ft. high for the storage of gasoline; three 2,000-bbl. fuel oil tanks 25 ft. in diam. by 24 ft.; four 5,000-bbl. Hortonspheres 38 ft. in diam. used to store butane; one 25,000-gal. cylindrical tank 120 in. in diam. by 40 ft. 4 in. long; three 19,000-gal. propane tanks, 106 in. in diam. by 39 ft. 2¼ in.; three 20,000-bbl. cone roof tanks 67 ft. in diam. by 32 ft. high and two 20,000-bbl. cone roof tanks 60 ft. in diam. by 40 ft. high.

In addition to the tanks mentioned above we design, fabricate and erect many kinds of refinery towers, Hortonspheroids, Hemispheroids and vapor-saving devices such as Horton Double-Deck Floating Roofs and Horton Vaporspheres. All three of our plants have facilities for x-raying and stress-relieving vessels to meet code requirements. Write our nearest office for complete information and quotations when you need steel plate work of this type.

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Chicago, 4.....2128 McCormick Bldg.
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Cleveland, 15.....2204 Guildhall Bldg.
Los Angeles, 14.....1423 Wm. Fox Bldg.
Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Tulsa, 3.....1606 Hunt Bldg.
Houston, 1.....5619 Clinton Dr.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Havana.....402 Abreu Bldg.
San Francisco, 11.....1254-22 Battery Street Bldg.
Detroit, 26.....1514 Lafayette Bldg.

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# CAMERON

## CHRISTMAS TREE WING

The Cameron Type "F" Forged Steel Flow-Wing is a model for compactness. Within its total overall length of 15¾ inches are combined all the units required to make up a Christmas tree wing, including a wing shut-off valve and either an adjustable or positive flow bean.

To change positive beans you simply fit an all-purpose wrench to the valve stem and close the valve, back out the bean retainer with the same wrench (the bean is retrieved with the retainer), replace the bean and reverse these operations. As a safety measure, the bean and its retainer cannot be removed until the valve is closed.

The Flow-Wing can be converted to an adjustable choke by substituting an adjustable stem and indicator plate for the pressure relief plug and replacing the small size bean with a ¾-inch positive choke to serve as a seat for the stem. This conversion, or any maintenance required, can be done without removing the unit from the well.

Complete details will gladly be sent to interested operators on request.

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**IRON WORKS, INC.**
P. O. BOX 1212, HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. West Texas: Odessa, Telephone 1710. California: 1442 Hayes Ave., Long Beach (7-2036). Oklahoma: 310 Thompson Bldg., Tulsa. Wyoming: 356 N. Wolcott St., Casper. North Louisiana: Bossier City (P. O. Box 425).

# PERSONALS

## Lenzen Takes New Post With California Standard

A VETERAN engineer and production executive, with years of experience in foreign production problems, is T. L. Lenzen, whose field of work has been broadened with his recent appointment to the post of general manager of Eastern Hemisphere operations for Standard Oil Co. of California.

Lenzen since 1944 has been assistant to the vice president in charge of foreign operations.

The Standard of California executive was graduated with distinction from Stanford University in 1927, and the following year received a degree in electrical engineering from the same university.

Joining Standard in 1928, Lenzen served in the engineering department in various capacities, including the making of surveys in Egypt, Saudi Arabia, and Bahrein, until 1944. Earlier this year he was named assistant to the manager of Standard's foreign producing department.

He also has served as secretary of the company's foreign operating committee and has worked closely with Arabian American Oil Co., Bahrein Petroleum Co., Ltd., California Texas Oil Co., Ltd., American Overseas Petroleum Co., and other companies operating outside the United States.

**Joe McIntosh,** recent graduate of the University of Michigan, has joined Cities Service Oil Co. as a geologist and scout.

**Homer Z. Martin** has been named assistant director of the petroleum section of the development division of Standard Oil Development Co. **Harold W. Scheeline** has been named assistant director of the chemical section. Named senior engineering associates were **Charles E. Hemminger, Walter G. Scharmann,** and **Stewart H. Hulse.**

**Milton E. Fox,** Carter Oil Co. engineer, has been transferred from Purcell to Seminole, Okla.

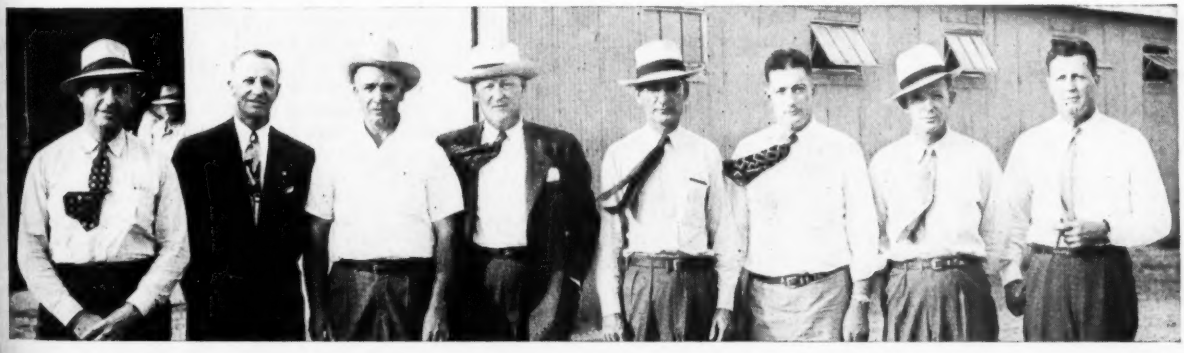
**Kirby E. Crenshaw** has been elected a vice president of Gas Advisers, Inc., a Cities Service Co. affiliate which handles engineering and technical services for natural-gas subsidiaries. Crenshaw has been a Gas Advisers director since 1943.

**Dr. William D. Rosenfeld** has accepted a position as microbiologist with California Research, Inc. (Standard Oil Co. of California). Rosenfeld formerly was associated with Dr. Claude E. ZoBell in the bacteria research work at Scripps Oceanographic Institute at La Jolla, Calif.

**Edward R. Valentine,** San Marino, Calif., oil operator, has been elected Southern California's new regional vice president of the California State Chamber of Commerce.

**R. L. Minckler** has been elected executive vice president of General Petroleum Corp. He joined General Petroleum in 1924, specializing in various phases of accounting. He became assistant to the president in 1934, a director in 1941, and a vice president in 1945. He was for several years a director of the Kettleman North Dome Association, and during the war, served as director of petroleum supply of the Petroleum Administration for War in Washington.

**W. L. Ingraham,** manager of the real-estate and right-of-way department of Standard Oil Co. of California, has been appointed to the newly created position of assistant coordinator of personnel development. Ingraham, a graduate in mechanical and electrical engineering of the University of California,



*Engineers, operators, and others associated with industry activities in the Permian Basin of West Texas recently reorganized the Permian Basin chapter of the American Petroleum Institute, Division of Production. The new officers of the group, shown here at their May 31 meeting in Odessa, are: D. A. Miller, Phillips Petroleum Co., Midland, chairman; R. B. Saxe, Gulf Oil Corp., Odessa, first vice chairman and program committee chairman; F. R. Lovering, Shell Oil Co., Inc., Odessa, second vice chairman; J. N. Dunlavey, Skelly Oil Co., Hobbs, N. M., third vice chairman; Jay Boxell, Phillips Petroleum Co., Midland, secretary-treasurer; C. C. Roripaugh, Shell Oil Co., Inc., Midland; publicity committee chairman; M. R. Hayes, Phillips Petroleum Co., Odessa, entertainment committee chairman; and M. M. Conn, Atlantic Refining Co., Odessa, meeting place and arrangements committee chairman*

# PERSONALS

joined California Standard in 1928 as boilermaker's helper at the company's Richmond, Calif., refinery.

C. W. SCHAEFFER

**Charles W. Schaeffer,** manager of Socony-Vacuum Oil Co., Inc.'s refinery at East Providence, R. I., now plans to retire, having stayed with the company 3 years beyond his normal retirement age to assist Socony - Vacuum through the closing days of the war and the initial postwar years. Shaeffer operated New England's first oil products line and was active in pipeline construction. He will be succeeded by **Henry A. Rickett,** superintendent of the East Providence refinery, who has been Shaeffer's assistant for 15 years.

**Howard G. Vesper,** president of California Research Corp., San Francisco, recently was in New York on a business trip.

**Rex M. Smith,** production geologist for Humble Oil & Refining Co., formerly at Houston, has been transferred to the eastern division with headquarters at Fort Myers, Fla. **W. S. Launey,** Humble, geologist, formerly at Fort Myers, has been shifted to the Gulf Coast division at Houston.

**C. A. Morris,** assistant division superintendent for Humble Oil & Refining Co. at Wichita Falls, Tex., has succeeded **Bert Broday,** North Texas superintendent, who retired after 49 years in the oil industry. **J. D. Exner,** superintendent of the company's Avoca, Tex., district, has taken over Morris' duties as assistant division superintendent.

**M. R. McArthur,** former production superintendent of the Rocky Mountain division for Phillips Petroleum Co., has been appointed production manager for Husky Refining Co. at Cody, Wyo.

**Prof. A. Michels,** director of the Van der Waals laboratory of the University of Amsterdam, the Netherlands, has been visiting oil-company laboratories in the Southwest in the capacity of a consultant in the field of high-pressure research to Anglo-Iranian Oil Co., Ltd. Michels, who also has been giving lectures in the United States since his arrival May 12, left Tulsa this week for Princeton University. He is scheduled to leave the United States in July.

**Robert Engleking** has bought the interests of **Clarence Pfabe** to dissolve Pfabe & Engleking, 18-year-old Montana oil-industry partnership.

**Kenneth Bolt** has been named assistant division superintendent in Oklahoma City for Stanolind Oil & Gas Co., to succeed **Frank Lindeman,** who has been transferred to Houston as assistant regional superintendent. Bolt has been serving in Stanolind's Tulsa office.

**Carl Van Hooser,** engineer, has been transferred by Kingwood Oil Co. from Jackson, Miss., to Perry, Okla.

**John C. Agnew** has been elected assistant secretary and assistant treasurer of Sun Oil Co. to serve with **H. W. Unruh,** who has held the position since 1931.

**Murrell D. Thomas** has resigned as a geologist for The Texas Co. at Ardmore, Okla., to join Eason Oil Co. in Oklahoma City in a similar capacity.

**E. D. Dickey,** senior gas tester, gas-gasoline, at Shell Oil Co., Inc.'s Wasson Plant No. 1, Denver City, Tex., has been transferred to Midland, Tex., as gas-contact representative. Other promotions and transfers in Shell's Texas-Gulf Coast organization include: **T. A. Abernathy,** chief clerk, production, Odessa, to chief clerk and storekeeper, Denver City; **R. W. Carlin,** junior laboratory assistant to senior laboratory assistant, exploration, Lake Charles; **R. C. Dawkins,** clerk, production, McCamey, to district clerk, production, Odessa; **G. G. Dixon,** senior laboratory assistant, exploration, Lake Charles, to clerk, exploration, Houston; **J. A. Graham,** junior exploitation engineer, production, Lake Charles to Black Bayou; **H. E. Harber,** head roustabout, production, Donaldsonville, to safety engineer, personnel and industrial relations, New Orleans area, Lake Charles; **H. C. Kimbrow,** roustabout, production, Odessa, to clerk, production, Hobbs; **F. Perkins, Jr.,** junior exploitation engineer, production, Black Bayou to Houma; **J. F. Pillard,** junior mechanical engineer, production, White Castle to Houma; **C. W. Summers,** clerk, production, Hobbs to McCamey; and **J. L. Teague,** assistant seismograph operator to seismograph operator, exploration.

**W. H. Esser,** Shell Oil Co., Inc., has been installed as president of the Petroleum Motor Transport Association of Oklahoma. Other new officers are **C. J. Martin,** Phillips Petroleum Co., first vice president; **G. L. Wheatley,** Cities Service Oil Co., second vice president; **C. E. Jackson,** Mid-Continent Petroleum Corp., secretary-treasurer.

**W. E. Wallace, Jr.** was elected president of the Shreveport Geological Society at its recent meeting. Other officers named were **Ed W. Scott,** vice president, and **Richard T. Chapman,** secretary-treasurer. Retiring officers are **T. H. Philpott,** president; **Brame Womack,** vice president, and **J. Ed Lytle,** secretary-treasurer.

**Ellis H. Scobey** has been named district geologist for Southern Minerals Corp. in the company's newly established district offices in Midland, Tex. Scobey until recently was associated with Bay Petroleum Corp.

*More than 400 industry leaders from Texas and the Southwest joined with Dallas civic leaders June 10 in a farewell dinner honoring John Glenn Pew (left) whose recent move to the Philadelphia headquarters of Sun Oil Co. followed his elevation to vice president in charge of production early this year. Tendered by the Dallas Chamber of Commerce and the Dallas Citizens Council, the occasion gave evidence of the very high regard in which Pew is held in Dallas where he has lived for the past 21 years. Toastmaster D. A. Hulcy (right), president of Lone Star Gas Co. and the Dallas Chamber of Commerce, introduced several speakers, including Carl A. Young, director, Division of Production, American Petroleum Institute, and John W. Timmons, chief counsel, Sun Oil Co. On the arrangements committee for the dinner were Jake L. Hamon, Cox & Hamon, Russell MacFarland, vice president of Seaboard Oil Co., and S. M. Gladney, manager of Sun's land department, and other members of the two civic organizations. An engraved plaque was presented Pew by Nathan Adams, chairman of the board of the First National Bank, Dallas*

C. H. SAMPLE

**Charles H. Sample,** of J. M. Huber Corp., has been elected president of the Houston Geological Society. Other new officers are **A. F. Childers, Jr.,** Gulf Oil Corp., vice president; **Hershal C. Ferguson,** independent geologist, secretary; **E. L. Earl,** Crown Central Petroleum Co., treasurer; and **L. B. Herring,** Second National Bank, Houston; **L. L. Nettleton,** Gravity Meter Exploration Co., and **Don Gahagan,** Skelly Oil Co., advisory committee members. Sample formerly was geologist and paleontologist with Houston Oil Co. of Texas; he is now Gulf Coast district geologist for the Huber corporation.

**George Vorbe,** professor of geology in New Mexico School of Mines, Socorro, will serve this summer as field geologist in the New Mexico area for Schweer & Hardison, Wichita Falls, Tex.

**A. A. Stambaugh,** vice president, Standard Oil Co. of Ohio, Cleveland, and **Maxwell M. McDowell,** head of the tax department, Standard Oil Co. of New Jersey, New York, have been elected directors of the American Management Association.

**Charles Allen Thomas,** executive vice president, Monsanto Chemical Co., received the Industrial Research Institute Medal at the second annual presentation of the award June 6 at the ninth annual meeting of the institute in Swampscott, Mass.

**Melvin D. Mauck,** Pure Oil Co., is now district geologist at Midland, Tex., replacing **Karl Mygdal,** geological reservoir engineer, who has been assigned to the company's Fort Worth offices. **Raymond D. Doty, Jr.,** geologist, has been transferred from Shreveport to Midland.

**H. R. Graves,** former foreman at Zionsville, Ind., for Panhandle Eastern Pipe Line Co., has been transferred to Delavan, Ill., to replace **K. R. Springer,** who has taken over the new Glenarm, Ill., district. Graves has been succeeded by **Joseph W. Roberts. John J. McCart, Jr.,** has been assigned as foreman at Glenarm under Springer.

**Charles F. Wilson,** Lone Star Gas Co., Dallas, was elected general chairman of the Public Utilities Group of the National Association of Purchasing Agents at its New York convention. Wilson was formerly vice chairman of the utilities group.

**Alex G. Bailey,** for 3 years with the Petroleum and Natural Gas Conservation Board of Alberta, first as deputy chairman and later as chairman, is taking over direction of exploration and development for Husky Refining Co., Lloydminster, Sask. **D. P. Goodall** has been named acting chairman of the Conservation Board.

**Selden R. Self** has resigned as district geologist for Amerada Petroleum Co. in Houston. With the company 19 years, Self was senior district geologist. A graduate of Texas Christian University in 1927, Self received his M.S. degree in 1928.

**John Norris,** geologist, has been assigned to the district office of Sunray Oil Corp. in Midland, Tex. He formerly was in Roswell, N. M.

**Joe L. Greer** was scheduled to assume his duties this week as deputy supervisor of the oil and gas division of the Texas Railroad Commission in charge of the Midland district office. Transferred from Austin, Greer succeeds **Ford Fullingim,** who resigned recently.

**Fred H. Moore** has been named district geologist for Magnolia Petroleum Co. at the newly established district geological office in Roswell, N. M. He was transferred from Illinois.

## SHIFTS—

**Richard A. Pohly,** geologist, Global Exploration Co., Floydada to Spur, Tex.; **H. V. Harden,** foreman, Magnolia Petroleum Co., Freer to Premont, Tex.; **H. W. Keehn,** superintendent, The Texas Co., Ganado to Seguin, Tex.; **T. H. Sandoz,** engineer, Pan American Production Co., Hamlin to Aspermont, Tex.; **G. P. Atkinson,** engineer, Shell Oil Co., Inc., Houston to Magnolia, Ark.

**Warren O. Johnson,** engineer, Republic Natural Gas Co., Golden, Colo., to Ellinwood, Kans.; **L. H. Simpson,** superintendent, Helmerich & Payne, Arcadia, La., to Pelahatchie, Miss.; **H. G. Williamson,** foreman, Atlantic Refining Co., De Ridder to Merryville, La.; **A. H. Sinclair,** engineer, United Gas Pipe Line Co., Rodessa, La., to Mineola, Tex.; **A. E. Keller,** engineer, The Texas Co., Cody, Wyo., to Rangely, Colo.

**F. D. Leigh,** engineer, Shell Oil Co., Inc., Houston to Kilgore, Tex.; **D. H. Cardwell,** geologist, Sun Oil Co., San Antonio to San Angelo, Tex.; **John Roy Johnson,** engineer, Shell Oil Co., Inc., Wichita Falls to Pampa, Tex.; **G. E. Wegner,** foreman, Helmerich & Payne, Inc., Marlow, Okla., to Great Bend, Kans.; **H. Allen Kelley,** engineer, Richfield Oil Corp., Bakersfield to Carpinteria, Calif.; **George A. Pfaffman,** engineer, Signal Oil & Gas Co., Los Angeles to Hermosa Beach, Calif.

# DEATHS

**W. O. Golden,** 63, oil producer and drilling contractor, died in Electra, Tex., June 12.

**Harry F. Couch,** 51, North Texas operator, died June 14 in a Gainesville, Tex., hospital.

**D. C. Smith,** 51, independent oil operator, died June 14 in a McKinney, Tex., hospital. He lived in Houston before moving to McKinney 2 years ago.

**Emery E. Preston,** 52, shop superintendent of the Houston branch of George E. Failing Supply Co., died June 7 at his home in Houston.

**Donald H. F. Macpherson,** 59, a former director of Gilmore Oil Co. and subsequently connected with the asphalt and road oil department of General Petroleum Corp., died June 8 in Riverside, Calif.

**Joe Cooper,** 52, drilling contractor, died June 14 in a Tulsa hospital. A native of Kentucky, Cooper had lived in Tulsa since 1914.

**W. Mortimer Smith,** 51, who served more than 20 years as secretary-treasurer of E. A. Landreth Oil Corp., Fort Worth, died June 7 in Los Angeles.

**S. E. Hatchett,** 57, chief engineer at the Kilgore, Tex., station for Magnolia Pipe Line Co., died June 11 in a Dallas hospital. He had been with the company 35 years.

**Harold B. Kellogg,** 54, president of Seaside Oil Co., died June 4 at his home in Santa Barbara, Calif. He was with Associated Oil Co. until 1936 when he joined Seaside as vice president.

**Joseph Gray Umpleby,** 34, former professor of petroleum engineering at Tulsa University and Pennsylvania State College and later associated with Engineering Laboratories, Inc., and Kobe, Inc., died June 8 in a Dallas hospital.

# Effect of Bacteria ON OIL PRODUCTION

**The role of bacteria in recovering oil from old fields, and perhaps from presently uneconomic sources, may become very important. This series of two articles, presents material obtained by the author in trips to La Jolla, Calif., and Bradford, Pa. All publicly available data up to this time are presented.**

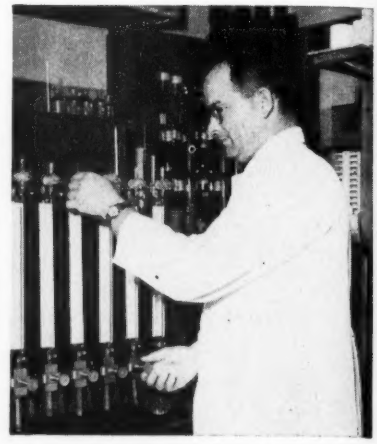
**by Charles J. Deegan**

IN 1903 the Wright brothers made the first successful flight in an airplane. It lasted only a few seconds, and at that time certainly seemed nothing to get excited about. Forty years later, fighter and bomber planes were changing the destiny of nations.

The present status of the effect of bacteria on the production of oil is relatively at about the same stage as the airplane in 1903. But enough interest exists right now among petroleum scientists to guarantee that it will not take 40 years to bring petroleum bacteriology to the same comparative stage of development as that of the airplane today.

While it is doubtful that ultimate developments from petroleum bacteriology will ever make such drastic alterations in the fate of nations as the airplane (with the possible exception of Canada); there is a reasonable probability that it will some day have a substantial effect on every county, state, and country in which oil has been produced in the past, or in which it is found in the future.

There is a definite possibility that the application of the science of microbiology to the petroleum industry may see such old oil-producing states as Pennsylvania, New York, Ohio, and West Virginia once again yielding production equal to as much oil as all of their past production. In Indiana, Illinois, Kansas, Oklahoma, and all the states where oil men are still finding many new fields, application of petroleum bacteriology may result in their old fields yielding another crop of oil equal to all that has been produced in the past by other methods. With the notable exception of Canada, the proven reserves of the world may conceivably be doubled ultimately through this one scientific discovery.



*Above: Dr. Claude E. ZoBell in his laboratory at Scripps Institute, La Jolla, Calif., using microrespirometer for measuring minute amounts of gas produced or consumed by bacteria*

*Left: Part of the Northern Hemisphere showing strategic location of Athabasca oil sands of Canada*

### Effect on Canada

Canada may be affected in a much greater degree than any other part of the world. If so, this will result from the historical accident that a possible major scientific discovery affecting her potential resources happens to coincide with a time period which there are only two giant powers in the world, the United States and Russia. Canada, unfortunately for her peace of mind, lies between the two, on the shortest route to direct contact, namely, over the top of the world.

Canada also contains the greatest known, but at this time commercially unavailable, oil deposit in the world, the Athabaska oil sands. Preliminary evidence indicates that the

application of bacteriology may provide the key that will make this deposit commercially available. On the basis of authoritative estimates, the Athabaska oil sands contain as much or more oil than the total presently known proven reserves of all the rest of the world combined. Estimates of the proven reserves of oil in these oil sands range from a conservative 100 billion barrels to an optimistic 250 billion barrels. The low figure of 100 billion barrels is equal to a fairly optimistic estimate of the presently known proven reserves of all the rest of the world combined.

While the general public may think of reasonable military preparedness in terms of rockets and atomic bombs, professional military men know that back of these must be enormous quantities of fuel to supply power. Atomic energy is not available as power now, only as an uncontrolled explosive. Until atomic energy is available as controllable power, the military look to either oil or coal for fuel.

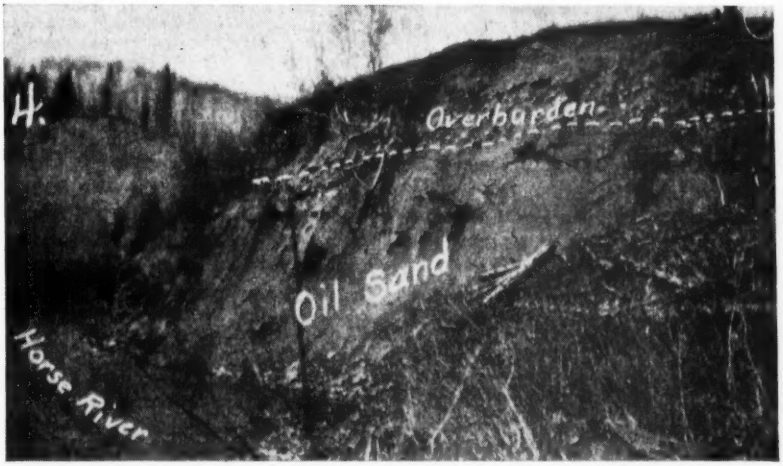
### Athabaska Potentialities

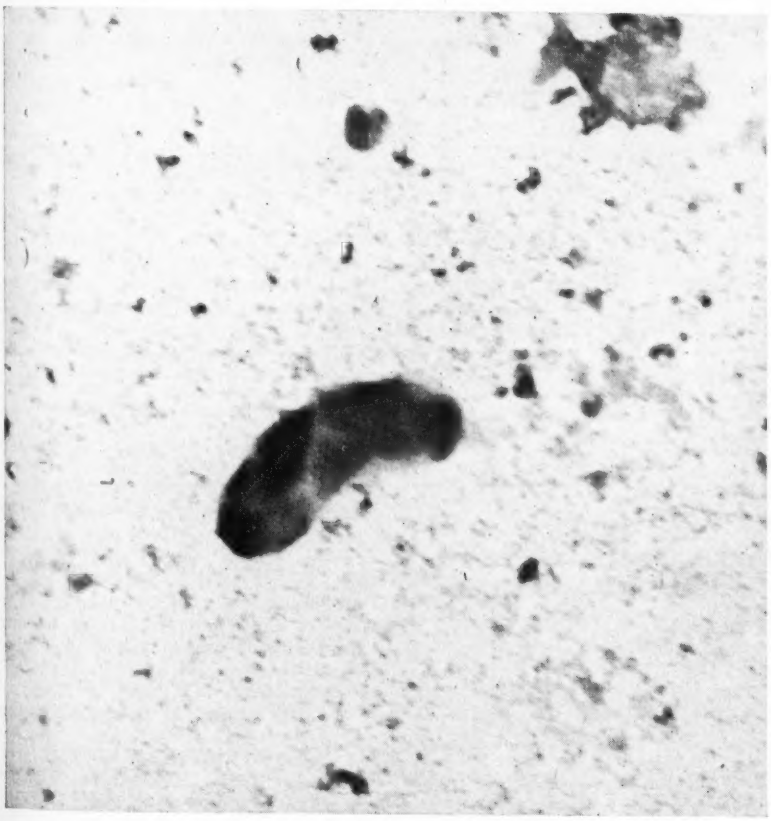
Therefore, if bacteriological techniques can make the Athabaska deposits commercially available, the result will be the greatest concentration in the world of liquid fuel for power. This concentration will be located at a strategic position from the standpoint of the joint defense of Canada and the United States. This possession of the greatest concentration of oil in the world at a strategically important geographic location is the factor that may have an important effect on the destiny of Canada.

The present situation arises out of one of those accidents that happen fairly frequently in fundamental research. Dr. Claude E. ZoBell, microbiologist of Scripps Oceanographic Institute (University of California), was doing work on the role of bacteria in the origin and accumulation of oil. This work was being carried on as part of the American Petroleum Institute fundamental research program. Such work was, and still is, Dr. ZoBell's primary objective.

In the course of his experiments, he discovered that certain strains of bacteria seemed to have the power of releasing oil from sand grains and from limestone. Investigation of this phenomenon up to a certain point was justified under the terms of his project, so long as it was confined to fundamentals, and not concerned with practical applications.

This distinction between fundamental principles and practical applications has had a substantial influence on the amount and rate of progress made to date in seeking solutions to



*Above: Scene showing a deposit of the Athabasca oil sand along Horse River. (Courtesy The Canadian Institute of Mining and Metallurgy)*

*Left: Electron micrograph of a sulfate-reducing bacterium of the type believed to release oil. Prepared by Dr. J. N. Bartholomew, University of Southern California, magnification 20,000 diameters*

commercial application problems. The restrictions arose because Dr. ZoBell's work was, and still is, financed from two sources of endowed funds, both of which by the terms of their original grants, are restricted to fundamental research. The two sources are the A.P.I. research endowment and certain endowed funds available to University of California, and Scripps Institute as a part of the university.

The trustees who administer these funds and pay for Dr. ZoBell's work are bound by the terms of the original grants. Dr. ZoBell is in turn restricted by the trustees' regulations. Therefore, although the original discovery of this effect of bacteria was made at the institute, the amount of work that can be done there is limited. Permission was granted to develop it as far as can be justified as fundamental research, but no work could be done that would cover de-

*Continued on page 113)*

# Haynesville Water-Injection Program Multiplies Expected Oil Recovery

**by George Weber**

A WATER-INJECTION program now under way in the unitized Haynesville oil field of Louisiana and Arkansas promises spectacular returns in oil recovery and income on investment. As a supplement to the gas-injection program which has been in operation for over 2 years, the water-food project is expected to boost ultimate recovery approximately 7 per cent over the maximum expected from the gas-injection pressure-maintenance program above.

Not only will production be augmented, but flowing life of the field will be prolonged and the over-all operational period for the unit will be reduced. Haynesville's prospects demonstrate the benefits accruing to unit field operation and well-engineered pressure maintenance of an oil reservoir during its flowing life, rather than costly secondary-recovery methods undertaken after depletion of gas energy and reservoir pressure.

The Pettit lime reservoir at Haynesville was first opened to production in November 1941 20 years after discovery of the old shallow field. Rapid development on 80-acre spacing proved major reserves in both the upper and lower Pettit horizons over an area of 14,500 acres. Oil withdrawals from the solution-gas-drive reservoirs reached a peak of 577,414 bbl. in October 1942. Despite three allowable reductions, continued heavy wartime production resulted in a precipitous decline in reservoir pressure, attended by mounting gas-oil ratios.

Many operators at Haynesville are also members of the Cotton Valley Operators Committee whose conservation record in the nearby gas-condensate field is well known. Foreseeing the results of rapid pressure decline, they proposed preventive measures on a field-wide basis and on May 1, 1944, adopted unitization and set up the Haynesville Operators Committee which shared with C.V.O.C. the same managerial and top engineering talent.

Oil production was voluntarily reduced still further, pending completion of a 15,700,000-cu. ft. hydrocarbon-extraction plant, oil and gas-gathering system, and gas-injection system for the unitized field. Gas injection to the upper Pettit reservoir began 10 months later. Its effect on the reservoir was soon apparent in arresting both the pressure and gas-oil ratio trends in wells adjacent to the gas input area.(Fig. 1). In January 1946 unit production was increased with expansion of the plant capacity to 22,000,000 cu. ft. daily. Although reservoir conditions continued to improve in the vicinity of the injection wells, pressures elsewhere continued dropping. On a field-wide basis, daily withdrawals of 6,000 bbl. of oil and 22,000,000 cu. ft of gas, 80 per cent of which was returned to the reservoir, amounted to only partial pressure maintenance. At those production rates, 25,000 bbl. of reservoir space was being voided daily. Injection of purchased gas to offset this withdrawal appeared economically impractical. Both the lower cost and the higher displacement efficiency of water favored water injection to the porous lime reservoirs, and a thorough investigation of such a program was ordered.

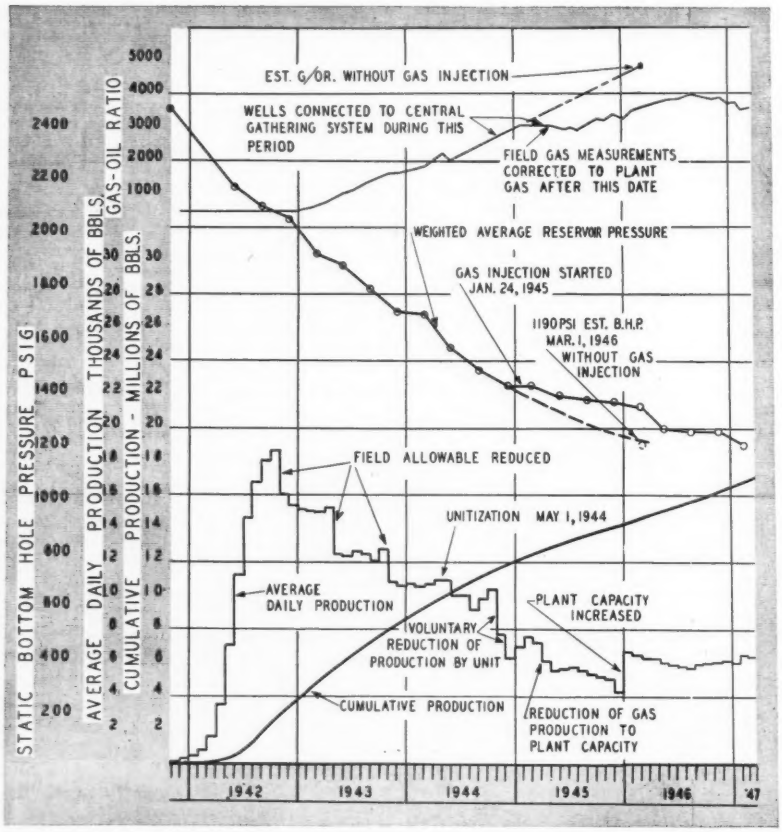

STATIC BOTTOM HOLE PRESSURE PSIG
AVERAGE DAILY PRODUCTION THOUSANDS OF BBLS.
CUMULATIVE PRODUCTION - MILLIONS OF BBLS.
GAS-OIL RATIO
EST. G/OR. WITHOUT GAS INJECTION
WELLS CONNECTED TO CENTRAL GATHERING SYSTEM DURING THIS PERIOD
FIELD GAS MEASUREMENTS CORRECTED TO PLANT GAS AFTER THIS DATE
WEIGHTED AVERAGE RESERVOIR PRESSURE
GAS INJECTION STARTED JAN. 24, 1945
1190PSI EST. B.H.P. MAR. 1, 1946 WITHOUT GAS INJECTION
FIELD ALLOWABLE REDUCED
UNITIZATION MAY 1, 1944
AVERAGE DAILY PRODUCTION
PLANT CAPACITY INCREASED
VOLUNTARY REDUCTION OF PRODUCTION BY UNIT
CUMULATIVE PRODUCTION
REDUCTION OF GAS PRODUCTION TO PLANT CAPACITY
1942
1943
1944
1945
1946
'47

*Fig. 1—Production history of Haynesville Pettit lime reservoir, Claiborne Parish, Louisiana, and Columbia County, Arkansas*

### Project Declared Feasible

Findings of the study, announced in January 1946, declared water injection feasible. The possibilities of such a project were found to be so great that its adoption was urged at the earliest possible date. In brief, the report stated that of the estimated oil reserves in place in both Pettit lime reservoirs, amounting originally to about 138,500,000 bbl., approximately 16.7 per cent or 23,000,000 bbl. would have been recovered by normal depletion methods. Gas injection to the upper Pettit is expected to recover an additional 8 per cent from that horizon. Water injection by conservative estimate

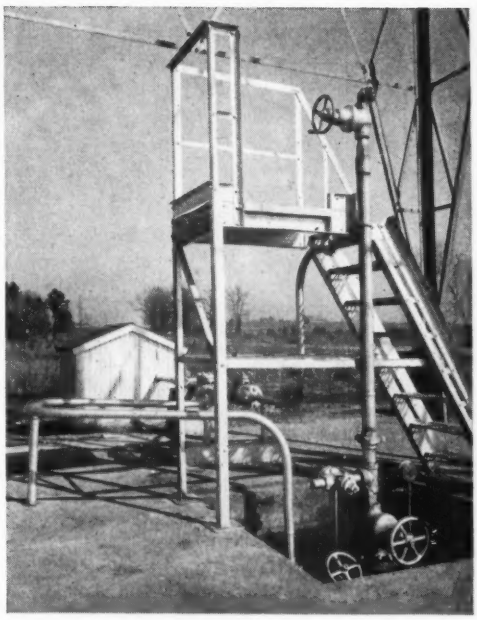
will boost field-wide recovery substantially, adding several million barrels to ultimate recovery from the upper Pettit. If realized, this expected return on a relatively modest investment in water injection facilities will make Haynesville a model project to be followed by future unit operators in other limestone fields.

The report stressed the need for beginning complete pressure maintenance at an early date. Such a program would: (1) reduce operation life of the field an estimated 2 years, thus reducing overhead costs per barrel of oil recovered; (2) greatly enhance the efficiency of the gas-injection program which will be continued; and (3) require less water and lower input pressures to displace oil in the reservoir.

To determine methods of employing the water flood, a field trial was recommended. Accordingly a well on the northeast edge of the field was converted to water injection. Results of this trial injection, begun in March 1946, proved successful and during that year five additional wells were converted to water injection. (See Table 1). Additional pumping equipment is now being installed and the full-scale field plan shortly will be in operation.

*Fig. 2—(Below) The water-flood pattern in the Haynesville unit calls for flooding the upper Pettit formation northward and southward from the state line, and eastward from a line of injection wells located along the west side of the Louisiana sector of the field*

*Fig. 3—(Right) This typical water-injection well shows the complete but relatively simple equipment required. Water is injected through both tubing and casing. The total stream is metered and controlled at each injection well*



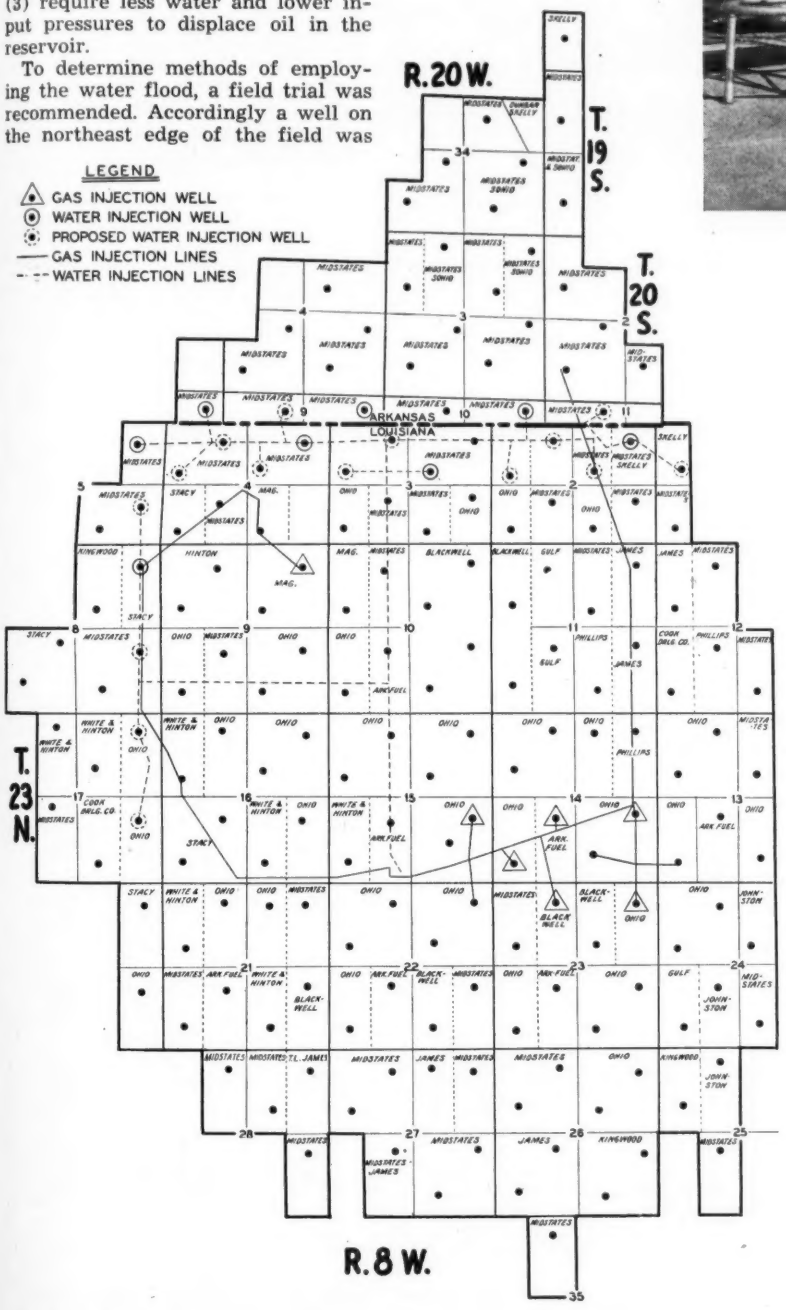



**TABLE 1—WATER INJECTION AT HAYNESVILLE**

| Date— | No. injection wells | Water injected, bbl. | Average injection pressures, psi. |
|---|---|---|---|
| March 1946 | 1 | 29,804 | 975 |
| April | 1 | 35,080 | 1,150 |
| May | 1 | 24,287 | 1,450 |
| June | 2 | 33,008 | 1,430 |
| July | 4 | 81,362 | 700 |
| August | 5 | 108,167 | 1,170 |
| September | 5 | 125,136 | 1,350 |
| October | 6 | 81,070 | 1,000 |
| November | 6 | 111,542 | 1,000 |
| December | 6 | 111,468 | 1,140 |
| January 1947 | 6 | 85,943 | 850 |
| February | 8 | 155,308 | 1,165 |
| March | 8 | 179,756 | 1,190 |

### Flood Pattern

Reservoir study showed that a flood pattern with a water front perpendicular to the north-south axis of the field would be desirable. In practice this pattern will be combined with a flank flood pattern originating on the west side of the field.

A shown in Fig. 2, the flood pattern now begun will sweep the upper Pettit northward and southward from the Arkansas-Louisiana border. To the 6 wells now injecting water may be added 17 more along the state line and down the west side of the Louisiana sector of the field. Pressure decline has been severe in the Arkansas sector of the unit, remote from the gas injection areas. This prompted the decision to initiate water flood

*(Continued on page 100)*

# The DIESEL FUEL Situation

**by E. F. Miller***

**and F. L. Nelson†**

MOST industries today are experiencing a volume of expansion of business with the result that many authors are "crystal balling" into the future demand and supply aspects. The net result is that there are as many different answers as there are prognostications. The figures presented here for the petroleum industry, although believed to be on the conservative side, are our best estimate of the future trends.

The anticipated growth of the petroleum industry in the United States is shown in Fig. 1. This curve shows that in 1950 we will be using about one-third million barrels more daily than in 1945. Except for the rapid increase in consumption during the latter part of the war, this curve is a continuation of the natural growth curve from a point in 1942. By 1960—or in about 12 years—the total consumption of petroleum products in the United States will have increased by one-half million barrels or about 10 per cent.

Any increase in demand for products is usually due to an extended use in established fields and to the development of new fields of applica-

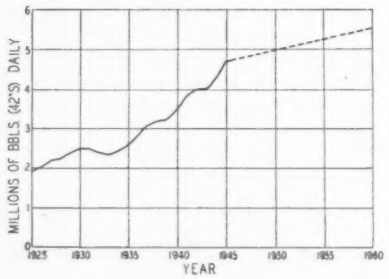



*Fig. 1—Consumption of petroleum products in the United States*

*Assistant to the director and †research engineer, Socony-Vacuum Laboratories (a division of Socony-Vacuum Oil Co., Inc.). This paper was presented at the nineteenth national oil and gas power conference, American Society of Mechanical Engineers, Cleveland, May 21-24.

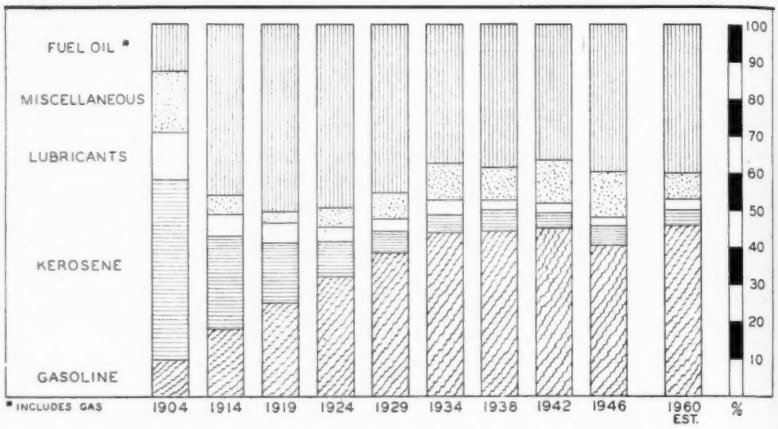



*Fig. 2—Relative consumption of principal petroleum products*

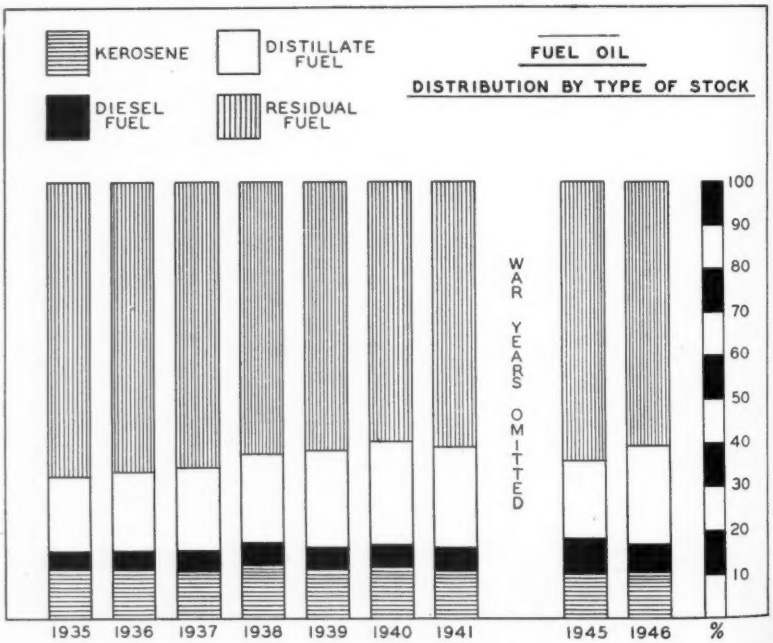



*Fig. 3—Fuel-oil distribution by type of stock*

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tion. The petroleum industry shows several examples of this as indicated by Fig. 2.

Exclusive of the war period, there have been few changes in the relative demands for petroleum products since 1934, the requirements having leveled out to about 45 per cent gasoline, 40 per cent fuel oil, 5 per cent kerosine, and the remainder lubricating oil and miscellaneous products. At the present time we know of no future developments which will change the ratio of these demands appreciably. Fuel for gas turbines will probably come from the fuel-oil range for industrial purposes and from the gasoline and kerosine range or both for aviation use.

The total fuel-oil consumption of the United States has been broken down as to distribution of type of stock in Fig. 3. As will be noted the year 1946 shows that 60 per cent of all the fuel oil consumed was of the residual type. The next largest category is distillate fuel (domestic heating oil) which constituted 22 per cent. Distillate diesel fuels represent 7 or 8 per cent of the total fuel-oil consumption or about 3 per cent of all the petroleum products used.

The future diesel-fuel market is expected to be somewhat as shown in Fig. 4. The total consumption will probably be about 135,000 bbl. per day in 1948 as compared to some 65,000 bbl. per day in 1939. Vessels were the largest users of diesel fuel and they will probably maintain this position for a few years with no appreciable increase in consumption. Railroad applications are, however, expected to have increased some tenfold in the 10-year period of 1939 to 1949. By 1950 railroad engines may use more diesel fuel than any other single type of installation.

The armed services, gas and electric companies, manufacturing and mines, and trucks and buses are all expected to more than double their consumption of diesel fuel in the same period.

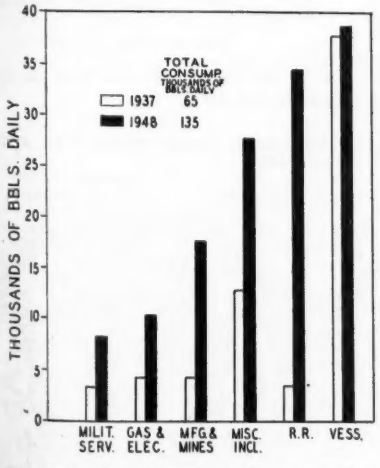



*Fig. 4—Projected demands for diesel fuel*

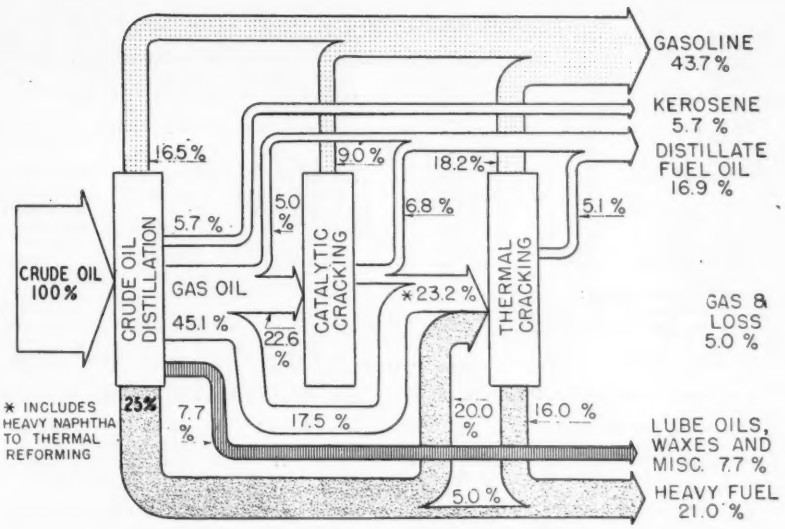



*Fig. 5—Estimated average refinery operation (total United States)*

The most frequent questions which engine builders have directed to the oil industry are naturally concerned with the characteristics of the fuels which will be available 5 to 10 years from now. In order to estimate diesel-fuel quality trends, it is necessary to consider the changes which will be made in refinery processing and the types of crude oil which will be available to the refiner.

Fig. 5 shows the flow diagram for an average refinery. Actually refineries vary widely and it is doubtful that one would be found operating in exactly the manner shown; however, this flow sheet will serve to show the present trend.

Although there are exceptions, new additions and replacements for refineries are of the catalytic rather than the thermal cracking type due to higher gasoline quality and total liquid yields obtainable with the catalytic processes.

Once we are resigned to the fact that cracking of some sort must be used, it can be shown that the diesel-fuel supply may result in a better compromise through the use of catalytic rather than thermal cracking.

### Present-Day Fuels

Table 1 shows the typical properties, sources, and uses of fuels at the present time. As indicated previously, residual Nos. 5 and 6 fuels constitute some 61 per cent of the total fuel oil production. Both these materials are made from straightrun and thermally cracked stocks, the No. 5 usually being a No. 6 fuel which has been cut back with distillate fuel. The No. 6 fuel has the lowest A.P.I. gravity and the highest heating value and is usually suitable only for industrial heating and marine boilers. Being a residual material it has by its very nature no boiling point at atmospheric pressure, the material cracking before vaporizing to any extent.

The No. 5 fuel by virtue of the distillate material it contains has a 90 per cent distillation temperature in the order of 650° to over 700° F. and a cetane number of 16 to 24. The usual application of this fuel is for industrial heating and, when the viscosity is low enough, for low-speed marine diesels.

The next largest class of fuel oils marketed is the distillate-fuel range comprising blends of straightrun, thermal, and catalytically cracked stocks.

The No. 3 fuels are generally about 60° F. higher in boiling range than No. 2 fuels. Cetane numbers of the Nos. 2 and 3 fuels are in the range of 35 to 55 and 30 to 45, respectively, depending on crude sources and the proportions of the different base stocks used. These fuels are most widely used for domestic heating with a relatively small portion of the production being used in medium and low-speed diesels. It is expected that this range of fuels will eventually be predominately catalytically cracked materials.

For high-speed diesel use, some refiners segregate a straightrun No. 2 fuel oil which generally has a cetane number of about 50. It has been estimated that on a national basis there is enough straightrun material of this type to supply all the potential demand for high-speed diesel fuel for several years to come. This statement, however, is misleading inasmuch as local conditions such as crude supply and refining facilities frequently govern. For example, the West Coast refiners are currently having difficulty making sufficient 50-cetane-number fuel to meet the demand. This situation is primarily due to the naphthenic crudes available in that area. Some West Coast refiners are currently resorting to solvent refining

**TABLE 1—TYPICAL PROPERTIES, SOURCE AND USES OF FUEL OILS**

| Fuel type | Distillate fuels | | | | Residual fuels | |
|---|---|---|---|---|---|---|
| Refinery name | Kerosine or No. 1 fuel oil | No. 2 fuel oil | No. 2 fuel oil | No. 3 fuel oil | No. 5 fuel oil | No. 6 fuel oil (Bunker C) |
| Processing | Straightrun | Straightrun | Straightrun Thermal Catalytic | | Straightrun Thermal | Straightrun Thermal |
| Principal uses | Heating illumination, high-speed diesels | High and medium-speed diesels | Domestic heating, high, medium and low-speed diesels—trucks, railroads, stationary power plants, marine | | Industrial heating, low-speed marine diesels | Industrial heating, marine boilers |
| A.P.I. gravity | 40-46 | 34-40 | 32-36 | 28-32 | 16-24 | 7-23 |
| A.S.T.M. distillation: | | | | | | |
| 10 per cent point, °F. | 370-400 | 400-460 | 400-450 | 460-510 | <600 | ..... |
| 90 per cent point, °F. | 460-500 | 560-630 | 560-630 | 600-660 | 650 to over 700 | ..... |
| Cetane number | 40-65 | 40-68 | 35-55 | 30-45 | 15-40 | ..... |
| Net heat of combustion, B.t.u. per gal. | 127,800-123,800 | 130,900-128,500 | 132,100-129,700 | 134,600-132,100 | 142,200-137,100 | 148,600-137,700 |
| Sulfur, weight per cent | 0.04-0.1 | 0.1-0.8 | 0.1-0.8 | 0.2-1.2 | 0.5-2.0 | 0.5-3.0 |
| Per cent of total fuel oil consumed, 1946 | 11 | 6 | 22 | | 61 | |

or additives in order to meet cetane requirements and since the volume of crude giving 50-cetane-number fuel by straight distillation is insignificant, fuels of this quality usually command a premium price.

No. 1 fuel oil sometimes contains cracked material but is usually composed only of straightrun products and is sold at a premium over domestic No. 2 heating oils and No. 2 straightrun diesel fuels.

It is obvious from this table that, for the highest efficiency, the heaviest fuel possible should be used so long as the other fuel properties are not detrimental to engine operation.

Inasmuch as suitable straightrun products will become short in supply in some areas and domestic fuel oil from cracked stocks will receive wider distribution than the straightrun No. 2 fuel oil, it would appear that the most flexible engine would be one which could operate satisfactorily on the future domestic and industrial heating oils. If such a trend takes place in the diesel industry, the refinery processing trend away from thermal toward catalytic cracking will be of distinct advantage for everyone concerned.

For example, the stability of catalytically cracked fuel oils is much better than that of fuel oils from thermal cracking. This characteristic of straightrun, catalytically cracked, and thermally cracked fuels is illustrated in Fig. 6. After 7 days' storage at 170° F., the nonvolatile material (residue after evaporation at 400° F. at 7 mm. Hg. in atmosphere of $CO_2$) formed in the catalytic and straightrun fuels was about one-fifth the amount formed in a thermally cracked fuel oil. Although these data are from accelerated laboratory tests, they were found to correlate reasonably well with long-term storage results.

That the catalytic processes produce a fuel oil of better quality than thermal processes with the same charge stocks, is further evidenced by the data shown in Table 2, which shows that fuel oils from catalytic processing are 5 to 11 cetane numbers higher than those produced from thermal cracking. These differences, however, can be greater or smaller depending on the severity of cracking. Usually the ignition quality of catalytically cracked fuel oils will be 2 to 12 cetane numbers below the straightrun fraction of the same boiling range from the same crude source.

### Sulfur Problem

No discussion of the future diesel-fuel situation would be complete without some mention of the long-heralded sulfur problem. Diesel fuels of high sulfur content are known to cause high wear and increase deposits in some engines under certain operating conditions. However, the mechanism of the reactions leading to these difficulties are not definitely understood at the moment. Neither has it been established whether or not any particular types of sulfur compounds are responsible for the behavior of high-sulfur fuels. These and other phases of the problem are currently being studied by such groups as the Coordinating Research Council, the Bureau of Mines, and various individual engine builders and oil companies.

The engines most affected by high-sulfur fuels are those in the medium and high-speed range. The larger-bore, low-speed engines have been operating on fuels of very high sulfur content (1 to 3 per cent) for several years and we are not aware of any difficulties due to the sulfur. Fig. 7 shows, however, that the heavy fuels may contain still higher sulfur concentrations, some residual fuels running as high as 5 to 6 weight per cent of sulfur. Whether or not the large engines will find these extremely high-sulfur fuels satisfactory remains to be seen.

The reason for having to use the high-sulfur fuels is obviously a shortage of low-sulfur crudes. In the past the refiner has avoided the use of these so-called "sour" crudes not only because of product specifications but also because sulfur is very corrosive to refinery equipment.

At the present time there are no

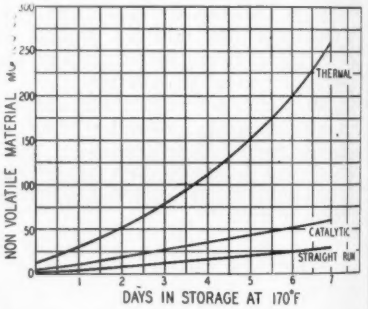
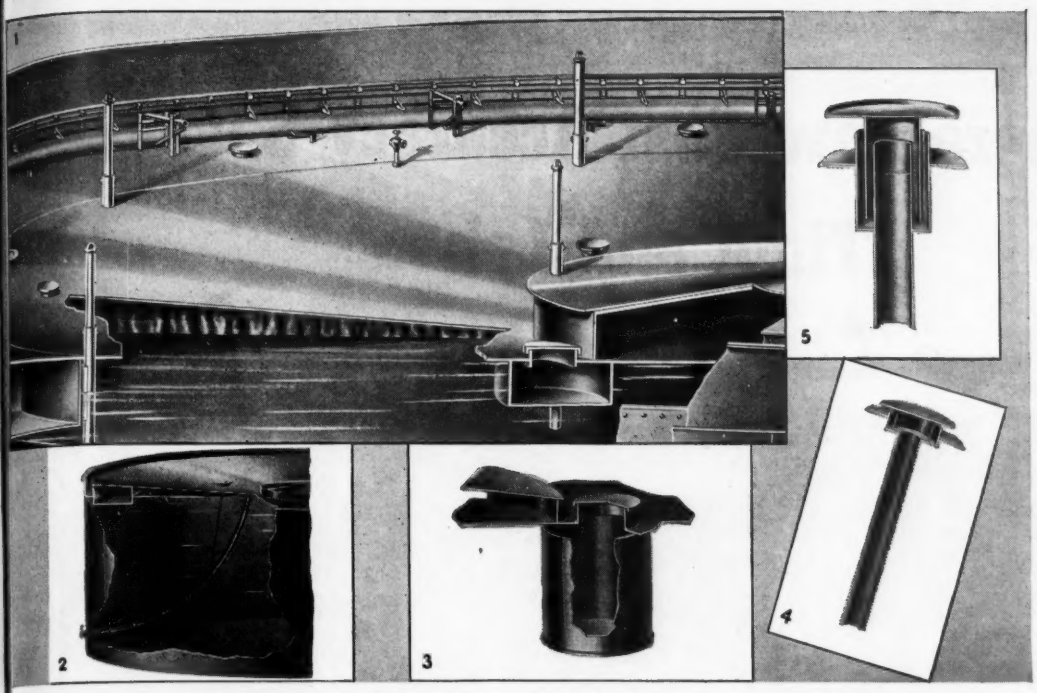



*Fig. 6—Accelerated storage tests on light distillate fuel oil*

**TABLE 2—PROPERTIES OF DISTILLATE FUEL OILS FROM CATALYTIC AND THERMAL CRACKING**

| Crude source— | Mirando (Naphthenic) | | Oklahoma City (Mid-Continent) | |
|---|---|---|---|---|
| Processing— | Catalytic | Thermal | Catalytic | Thermal |
| A.P.I. gravity | 24.7 | 23.6 | 33.7 | 29.9 |
| A.S.T.M. distillation, °F.: | | | | |
| I.b.p. | 452 | 404 | 488 | 359 |
| 10 per cent | 477 | 462 | 519 | 472 |
| 50 per cent | 512 | 492 | 575 | 550 |
| 90 per cent | 594 | 542 | 650 | 638 |
| End point | 677 | 593 | 683 | 681 |
| Cetane number | 28 | 23 | 55 | 44 |
| Yields, volume per cent: | | | | |
| Light distillate fuel | 42.5 | 65.2 | 48.7 | 56.0 |
| No. 6 fuel oil | 3.5 | 17.2 | 3.5 | 4.1 |
| Gasoline | 44.5 | 13.7 | 40.0 | 35.7 |

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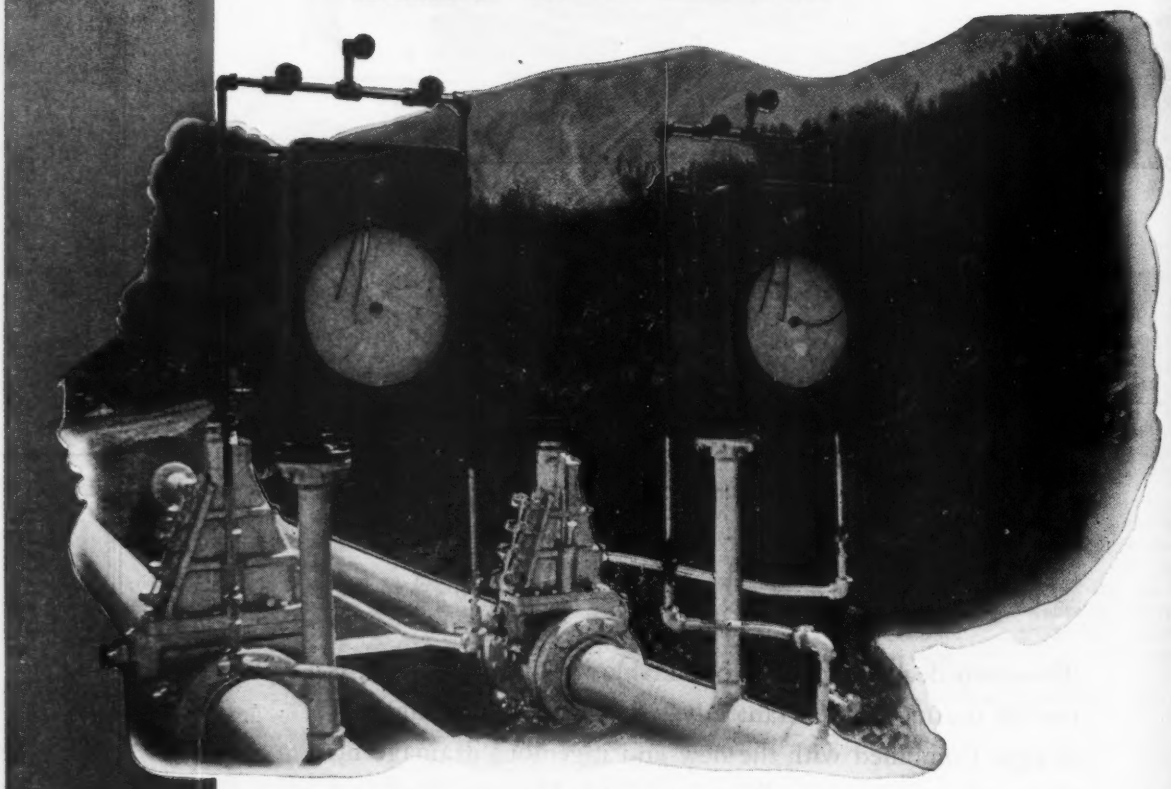

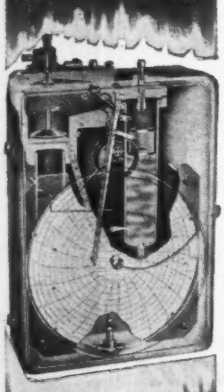

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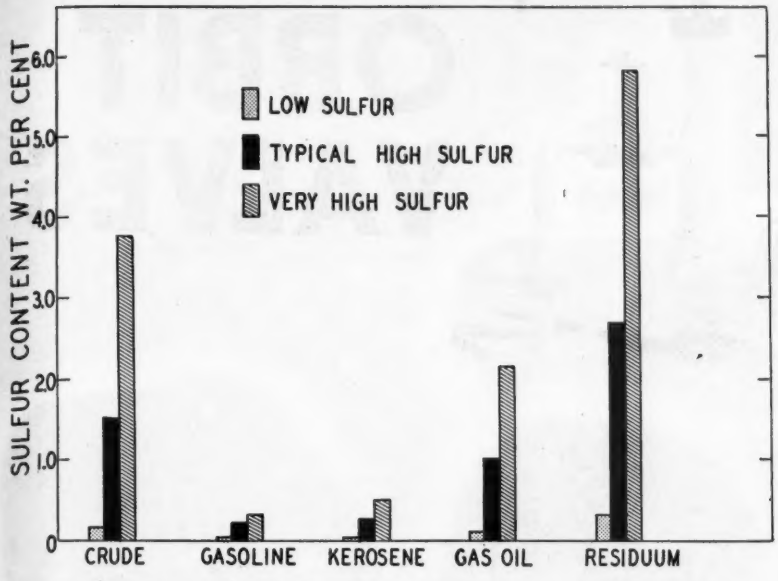



*Fig. 7—Sulfur content of fractions from crude oils of various sulfur contents*

economically feasible treating methods for removing sulfur compounds from fuel oils. There may be at least a partial improvement in the utilization of these fuels through the development and use of improved lubricating oils. High-sulfur fuels are definitely in the offing and while some relief may be seen through changes in engine design and the use of modified lubricating oils, there is no fuel-treating process available and no real solution to the problem can be offered by the refiner at the moment.

This has been a rather pessimistic view of the diesel-fuel situation; however, such is the case. As pointed out previously the demand for all petroleum products is increasing, particularly the demands for gasoline and fuel oil. In this regard between 2 and 2½ million new oil burners are scheduled for installation in the next few years requiring a large portion of the distillate fuel.

Refinery processing trends will be toward the use of more catalytic cracking in order to increase total liquid yield and gasoline quality. In order to meet the increased demands it will also be necessary to use high-sulfur crude which means a higher sulfur content in the products.

The effect of these trends on product characteristics will be evidenced by a gradual disappearance of the conventional 50-cetane-number, low-sulfur diesel fuel. This will be replaced by a 36-42 cetane fuel of fairly high sulfur content. Due to competition with gasoline for this fraction of the crude, the increased use of domestic heating oils and diesel fuel may result in an increase in the cost of the distillate fuels relative to the price of gasoline.

The users of residual-type fuel oils will also encounter other bidders for their fuel supply because of a recently acquired feeling by some industrial concerns to rely on oil rather than coal as a source of power. This factor, which has already contributed to residual fuel shortages in certain areas, combined with refinery processing trends indicates that it will be some time, if ever, before residual fuels are again a drug on the market.

The only factor affecting the quality of residual fuels is the use of high-sulfur crudes. In view of past performance, however, the large engines may not encounter any operational difficulties due to this change.

Although the tone of this discussion has been pessimistic in indicating that the future diesel-fuel supply will be lower in cetane number and higher in sulfur content, the problems are not without solution. For the most part there has been no definite indication that low-cetane-number fuels will increase maintenance difficulties to any appreciable extent. It is known, however, that fuels of high-sulfur content can increase wear and deposits in certain types of installations. In the event that modified engine designs or improved lubricants do not solve these problems, the consumer will have to balance the premium cost of low-sulfur fuels against his maintenance costs.

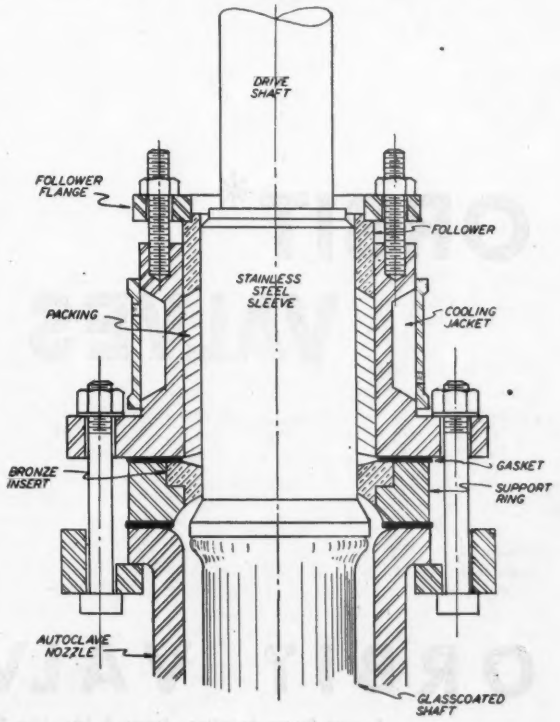
# Improvement in Agitator Stuffing Box

**by J. E. Troyan***

IN the emulsion polymerization of various plastics or elastomers in agitated autoclaves, the agitator stuffing box must give a positive seal preventing leakage of lubricants into the vessel, as well as leakage of gaseous comonomers from the charge. Precoagulation of the latex and retardation or inhibition of reactions may be experienced when contamination by stuffing box lubricant or packing occurs. The loss of reactants from the system, though not as objectionable, may involve variations in the composition of copolymer in addition to safety hazards.

Both types of leakage were encountered in a glass-lined pilot-plant polymerizer which was equipped with a stirrer stuffing box designed so that the packing was supported mainly by a shoulder on the rotating shaft. Additional support was presumably af-

*(Continued on page 114)*

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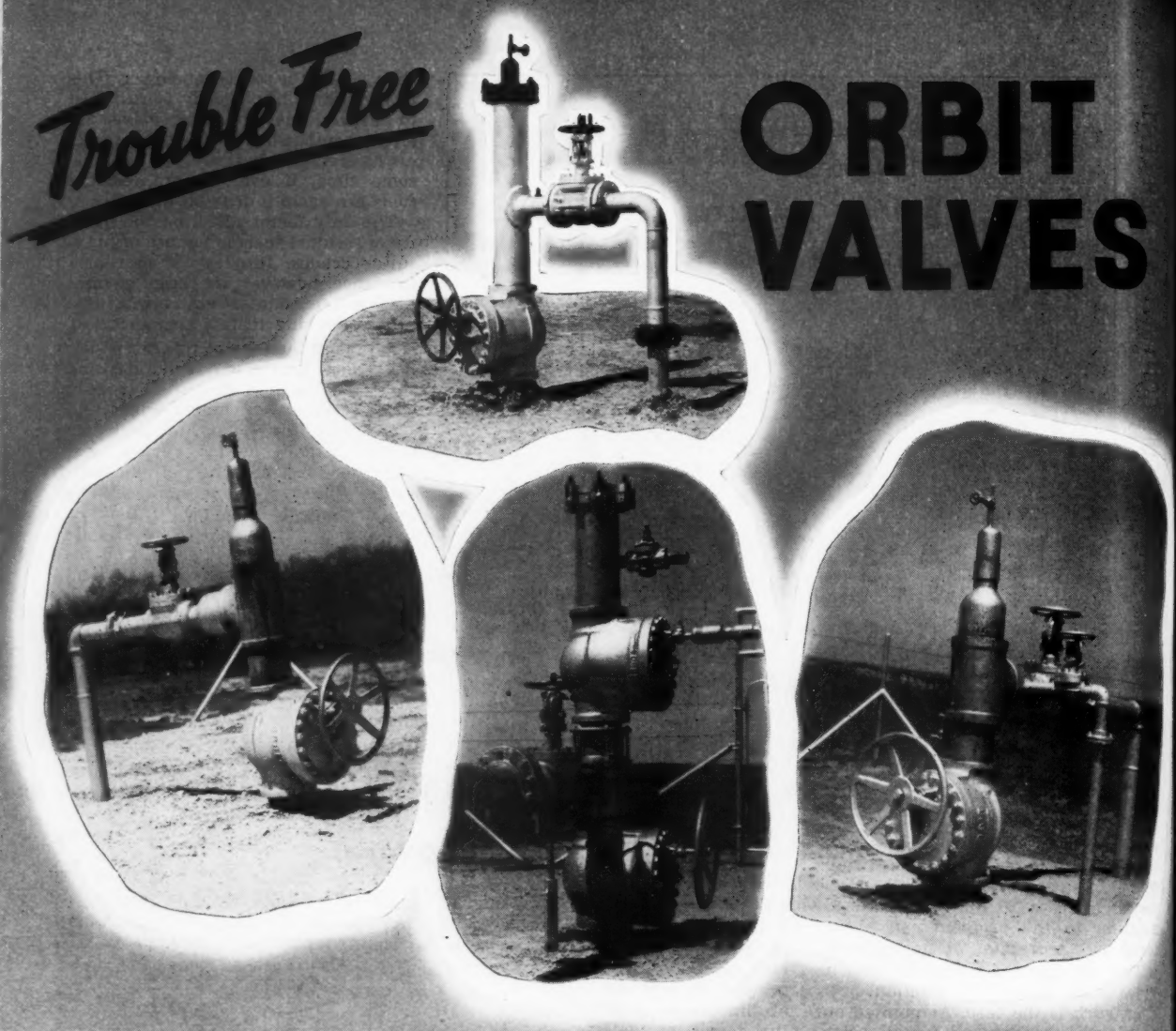

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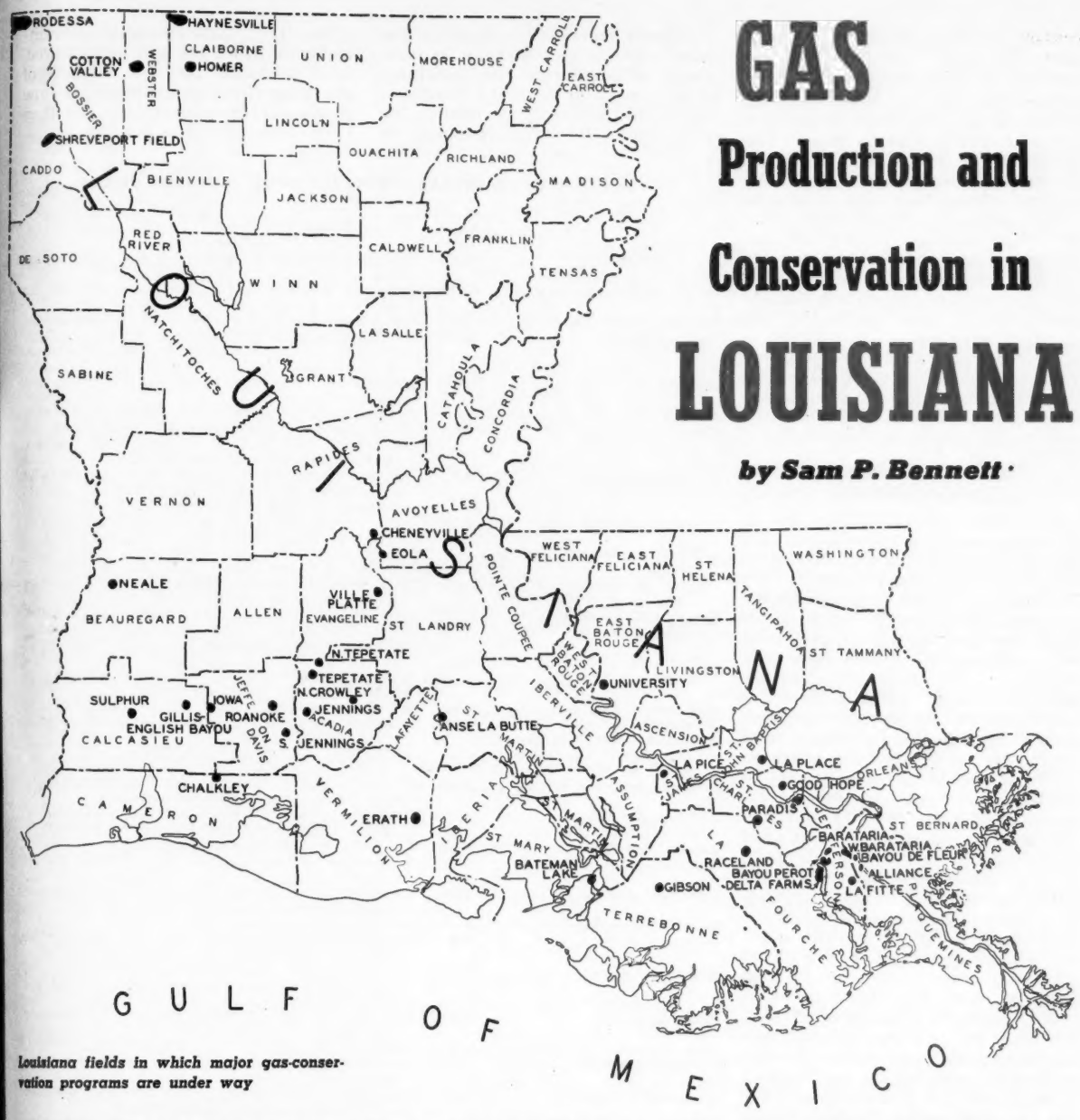
# GAS
## Production and Conservation in
# LOUISIANA

**by Sam P. Bennett***




*Louisiana fields in which major gas-conservation programs are under way*

PRIOR to 1940, natural gas was generally considered to be an inexhaustible natural resource and little consideration was given to the economic or physical feasibility of saving and utilizing that portion produced in conjunction with oil. Accurate data on the amount of gas from gas condensate and oil wells vented to the atmosphere in the State of Louisiana during the decade from 1930-40 are not available, but it is estimated that the gas flared each day from one particular field during this period was approximately four times the amount presently burned to the atmosphere each day in the state.

Joseph L. McHugh, commissioner of the Louisiana State Department of Conservation since February 1, 1941, was one of the first to visualize the possibility of utilizing this vast amount of wasted energy; and to recognize and decry the underground waste of liquid hydrocarbons which it engendered. It has been through his able and sincere administration of the Louisiana oil and gas law (Act 157 of the Louisiana Legislature of 1940) and his ability to obtain the cooperation of the oil industry, that such great strides have been made in conserving the mineral resources of the state in the past 6 years.

### Outstanding Fields

Table 1 lists 39 fields as outstanding examples of gas conservation achieved by the oil and gas industry through installation of gathering systems, compressor capacity, dehydration plants, gasoline plants, pipe lines, and other equipment necessary to process, reinject and/or market gas produced incident to the production of crude oil or condensate. Many of these gas-utilization installations were marginal or submarginal investments, at the time of construction, from the standpoint of dollar value of the gas saved and sold. Disregarding this fact, the various companies involved made the required investments in order to conserve this valuable resource, with the hope that the reduction in underground waste of crude oil and condensate would offset that portion of expenditures not directly recoverable from the value of gas saved and sold. Subsequent price increases for both oil and gas have enabled a great per-

*Assistant to chief engineer, Louisiana Department of Conservation.

centage of these projects to stand alone financially, and to return the operators a reasonable profit.

In addition to these outstanding examples of gas conservation resulting from the efforts of Commissioner McHugh and the cooperation of the industry in Louisiana, there are, at the present time, four major cycling plants processing approximately 475,000,000 cu. ft. of gas per day with all processed gas being utilized or reinjected. With the exception of the Cotton Valley plant, it is impossible to determine the exact amount of gas these operations save as compared to normal competitive field operations, since the plants were built early in the life of the fields and it is impossible to ascertain what portion of the gas would have been flared had not cycling been initiated.

### Flare-Gas Reduction

It is often stated that flare gas in Louisiana has been reduced from 550 million cubic feet per day in 1941 to 200 million cubic feet per day in 1946. Without any further inquiry into the statistics, it would seem logical to assume that the amount of gas saved is the difference between these two figures, i.e., 300 million cubic feet per day. The data in Table 2 indicate this assumption to be patently incorrect since oil production (crude oil and condensate) in the state has increased from 323,000 bbl. per day in 1941 to 408,000 bbl. per day in 1946, an increase of 26.3 per cent. Table 2 further shows a reduction in casing-head gas, produced incident to oil, from 250 billion cubic feet per year to 167 billion, a reduction in produced gas-oil ratio from 2,120-1 to 1,120-1, and a reduction in flared gas-oil ratio (cubic feet of gas flared per barrel of oil produced) from 1,710-1 in 1941 to 518-1 in 1946. The fields listed in Table 1 represent a saving of 260 million cubic feet per day and the most conservative estimate of the reduction of flare gas effected by the issuance of Department of Conservation Order No. 45-I, establishing the base gas-oil ratio at 2,000-1, is approximately 80 million cubic feet per day. These figures alone would exceed the estimated 300 million cubic feet per day of gas conserved.

It would certainly seem logical to assume that in the absence of better completion and production practices and without the application of improved conservation rules and regulations, the produced gas-oil ratio and therefore the flared gas-oil ratio for Louisiana in 1946 would have equaled the 1941 figure. It is the writer's opinion that application of the 1941 flared gas-oil ratio to the 1946 oil production, and comparison to the known 1946 data would obtain the most reasonable estimate of gas saved. This results in an estimated figure of total gas saved of 485 million cubic feet per day.

Projects now in the planning and construction stages and to be completed either during the remainder of this year or in the first 6 months of 1948 should utilize approximately 100 million cubic feet of gas per day. As a result of these concrete commitments to utilize gas now being flared, it is predicted that the amount of gas being flared in Louisiana in June 1948 should be substantially less than 150 million cubic feet per day.

**TABLE 1—METHODS OF GAS CONSERVATION IN LOUISIANA FIELDS**

| Field and Parish— | Gas saved, M.c.f. per day | Method |
|---|---|---|
| Homer, Claiborne | 1,100 | Processed through gasoline plant and sold to pipe line |
| North Tepetate, Acadia | 18,100 | Processed through dehydration plant and sold to pipe line. |
| Roanoke, Jefferson Davis | 6,000 | Installation of gathering system and pipe-line outlet. |
| Rodessa, Caddo | 12,000 | By pipe-line outlets obtained after issuance of Dept. of Cons. order prohibiting flaring of gasoline-plant tail gas. |
| Rodessa, Caddo | 4,000 | Installation of facilities to gather and utilize gas after gas lift. |
| University, E. Baton Rouge | 3,500 | Installation of gathering system and pipe-line outlet. |
| Ville Platte, Evangeline | 40,000 | (1) Reinjection of gas into producing reservoirs, (2) pipe-line outlet, (3) Dept. of Cons. Order No. 45-I, (4) Erection of carbon black plant. |
| Gibson, Terrebonne | 5,500 | Redesign of gathering facilities and installation of compressors has made this additional amount available for pipe line. |
| North Crowley, Acadia | 9,000 | Installation of additional compressors and high-pressure separators. |
| LaSalle Parish area, LaSalle Parish | 10,000 | Curtailment in use of natural gas for gas lift. |
| Paradis, St. Charles | 11,000 | Installation of gathering system and pipe-line outlet and addition of compressor capacity. |
| Raceland, Lafourche | 3,000 | Installation of gathering system and pipe-line outlet. |
| Chalkley, Cameron | 7,000 | Reinjection of gas for storage purposes and additional marketing facilities. |
| LaPice, St. James & Assumption | 2,500 | Installation of additional compressor capacity to utilize low-pressure gas for gas lift. |
| Haynesville, Claiborne | 20,000 | Installation of pressure-maintenance plant. |
| Westwego, Jefferson | 1,200 | Installation of gathering system and pipe-line outlet. |
| Barataria, West Barataria, Delta Farms, Bayou Perot, Bayou de Fleur, Alliance fields, Jefferson Parish | 20,000 | Gathering system installed and market available. Pipe line is now under construction. |
| LaPlace, St. John | 10,000 | Gathering system and pipe-line outlet installed. |
| Good Hope, St. Charles | 2,000 | Gathering system and pipe-line outlet installed. |
| Lafitte, Jefferson | 12,000 | Processed through gasoline plant. |
| Sulphur Mines, Calcasieu | 2,000 | Recompressing flare gas for use in closed gas-lift system. |
| Jennings, Acadia | 1,500 | Recompressing flare gas for use in gas-lift system to replace use of natural gas from gas wells. |
| Neale, Beauregard | 12,000 | Processed through gasoline plant. |
| Iowa, Calcasieu | 10,000 | Processed through gasoline plant and sold to pipe line. |
| Gillis, Calcasieu | 15,000 | Oil well gas from East Moss Lake, Mermentau, and Lake Arthur processed through gasoline plant and sold to pipe line. |
| Eola, Avoyelles | 19,000 | Processed through gasoline plant and tail gas used and sold. |
| Anse La Butte, St. Martin | 3,000 | Processed through gasoline plant and sold. |
| Shreveport, Caddo & Bossier | 3,100 | Processed through gasoline plant and sold to pipe line. |
| Cheneyville, Rapides | 3,550 | Processed through gasoline plant with tail gas used and sold and a small amount vented. |
| Tepetate, Acadia | 13,000 | Processed through gasoline plant with tail gases used, sold, and returned to producing formation. |
| Cotton Valley, Webster | (*) | Processed through cycling plant and returned to producing formations. |
| South Jennings, Jeff. Davis | (*) | Processed through cycling plant and returned to producing formations. |
| Bateman Lake, St. Marys | (*) | Processed through cycling plant and returned to producing formations. |
| Erath, Vermilion | (*) | Processed through cycling plant and returned to producing formations. |

*Cotton Valley, South Jennings, Bateman Lake, and Erath cycling plants processing approximately 475,000,000 cu. ft. of gas daily. Except for Cotton Valley, it is impossible to determine exact amount of gas these operations save as compared with normal competitive field operations since plants were built early in life of field.

**TABLE 2—OIL AND GAS PRODUCTION IN LOUISIANA (1941-46 INCL.)**

| Year | Crude oil and condensate, bbl./yr. | Casinghead gas, M.c.f./yr. | Natural gas, M.c.f./yr. | Crude oil and cond. prod., bbl. per day (avg.) | Average produced GOR | Gas flared, M.c.f. per day | Cu. ft. of gas flared per bbl. of oil produced |
|---|---|---|---|---|---|---|---|
| 1941 | 118,030,053 | 250,187,963 | 375,000,000 | 323,370 | 2,120-1 | 550,000 | 1,710 |
| 1942 | 119,162,462 | 250,000,000 | 425,000,000 | 326,473 | 2,100-1 | 500,000 | 1,532 |
| 1943 | 122,262,072 | 245,668,805 | 515,026,910 | 334,964 | 2,009-1 | 420,000 | 1,253 |
| 1944 | 136,619,366 | 190,310,766 | 609,210,939 | 374,299 | 1,393-1 | 378,000 | 1,011 |
| 1945 | 139,134,648 | 178,845,831 | 617,299,534 | 381,190 | 1,285-1 | 286,000 | 750 |
| 1946 | 149,234,492 | 167,171,182 | 591,997,209 | 408,860 | 1,120-1 | 212,000 | 518 |

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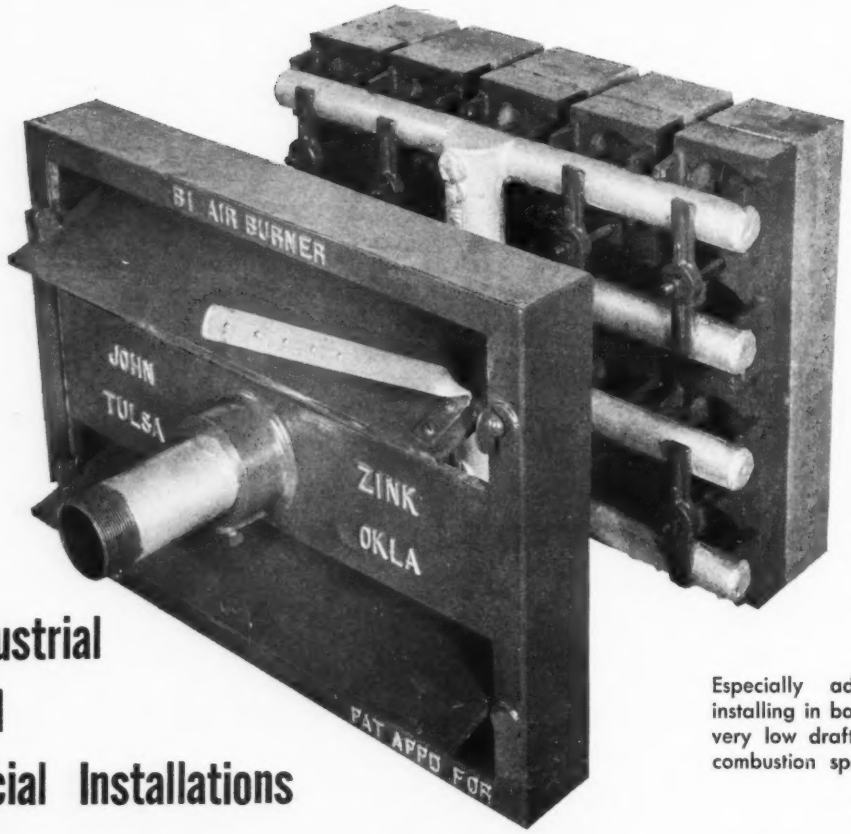


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# PROGRESS IN METALS

**by W. L. Nelson**

Consulting Engineer

## Warm-Worked Casing

CONTRARY to the expectation of metallurgists, the physical properties produced in oil-field casing by warm-working are generally superior to the properties obtained by the customary cold reduction and aging treatments. Casing manufactured by National Tube Co. using its warm-working process is reported by J. Jay Dunn in the July 1946 Iron & Steel Engineer (Association of Iron & Steel Engineers). As deeper and deeper wells are drilled, steel manufacturers have constantly improved the collapse pressure of oil-field casing. Warm-working may be defined as a process whereby the last size reduction (up to some 8 per cent of the diameter) is made at a temperature between the blue brittle range and the lower critical temperature. The effect of warm-work may be judged by the following tabulation (5.36 per cent reduction):

| Temperature of reduction | Yield strength |
|---|---|
| Room | 92,080 |
| 500 | 112,420 |
| 650 | 108,500 |
| 850 | 98,120 |
| 970 | 82,550 |

The analysis and hot-rolled properties of the regular hot-rolled product are:

| | |
|---|---|
| Carbon, per cent | 0.41 |
| Manganese, per cent | 1.06 |
| Phosphorus, per cent | 0.015 |
| Sulfur, per cent | 0.02 |
| Silicon, per cent | 0.18 |
| Yield strength, psi. | 58,400 |
| Ultimate strength, psi. | 102,600 |
| Elongation, per cent in 2 in. | 26.5 |
| Collapse pressure, D/t = 21.15 psi. | 4,225 |

Increases of 39 or 65 per cent over the strength of a hot-rolled product are so impressive that similar studies of other products would appear to be justified.

## Monel Sucker Rods

IN a representative test survey of over 3,000 pumping wells in the Mid-Continent and Gulf Coast areas, covering a 2-year period, it has been reported that sucker-rod failures were responsible for 15.5 per cent of the well-repair jobs and for 17.5 per cent of the total expense. In certain fields, notably West Texas, corrosion is severe and difficulties with sucker rods are even more common. In such fields the rods are simultaneously subjected to cyclic stresses and to the action of hydrogen sulfide and oil-well brine. Vol. 3, No. 9 of Process Industries Quarterly, of International Nickel Co., relates experience with an installation of K-monel rods in the 2 Arrington well of Howard-Glasscock pool at Big Spring, Tex. Regular rods had been failing at a rate of one every 50 days and the situation was getting progressively worse. The entire string had to be replaced every 5 months.

In November 1941 a trial string of K-monel rods was run. The rods were examined in December 1945 when the pump was being repaired and they seem as good as new. No failures due to regular service have occurred and the rods have been in continuous service from November 1941 to July 1946. Fabrication of the rods was done by W. C. Norris, Manufacturer, Inc., Tulsa. Although K-monel is expensive, its use would mean a great saving if continuous service through 6 or more years can be had. In addition, this alloy exhibits excellent mechanical properties:

| Elongation, per cent in 2-in. | Collapse pressure | Increase in collapse pressure over hot-rolled, per cent |
|---|---|---|
| 24. | 5,883 | 39.25 |
| 15.9 | 6,931 | 64.04 |
| 16.3 | 6,973 | 65.04 |
| 19.2 | 6,738 | 59.48 |
| 22.9 | 6,133 | 45.16 |

| | |
|---|---|
| Ultimate tensile strength, psi. | 152,700 |
| Yield strength, psi. | 103,500 |
| Elongation in 8-in., per cent | 25.8 |
| Reduction of area, per cent | 43.5 |

## Wear Resistance of Gray Irons

ALTHOUGH the wear resistance of gray irons is related to the microstructure of the iron, most users and even foundry men are unable to predict the wear resistance of a particular iron with confidence. Frederick G. Sefing in his "Wear Resistance of Gray Irons" (Am. Foundryman, Vol. 9, June 1946, pp. 77-79) classifies the microstructures (and kinds) of gray iron with respect to wear resistance as follows. The best materials are listed at the top of the tabulation.

A. Ni-Resist, a fully austenitic gray iron with no massive cementite. Hardness 135-170 Brinell.

B. Acicular structures alloy gray iron with small amounts of austenite. 220 or more Brinell.

C. Refined and completely pearlitic matrix with A.F.A. Type A graphite. 200-320 Brinell.

D. Coarse pearlitic matrix with no free ferrite.

E1. Pearlite with a small amount of free ferrite matrix with A.F.A. Type A graphite. 160-190 Brinell.

E2. Abundant ferrite matrix with A.F.A. Type A graphite. Less than 150 Brinell.

F. Some massive cementite or phosphide matrix with any form of graphite. Plain gray iron over about 230 Brinell.

G. Ferrite matrix associated with dendritic graphite A.F.A. Type D or E graphite. 180 or more Brinell.

Composition alone is not enough to impart wear resistance because microstructure is vital, but in a general way alloy elements have been found useful. As an example, the American Foundrymen's Association in its Cast Metals Handbook (Chicago) under the heading of Specific Applications of Alloy Cast Irons (1940), mentions wear resistance about 90 times. Among these 90, special alloy elements are indicated the following number of times:

| | |
|---|---|
| Chromium | 66 |
| Molybdenum | 32 |
| Titanium | 12 |
| Vanadium | 2 |
| No alloy element | 3 |
| Nickel | 67 |
| Copper | 5 |

Nickel and copper were listed last because it is doubtful that these elements were used directly for improving wear resistance.

## Reda Pump Employs Corrosion-Resistant Alloys

AT one time in the development of the Reda centrifugal oil-well and brine-well pump, difficulty was encountered with corrosion. The pump of Reda Pump Co. of Bartlesville, Okla., consists of an electrically driven multistage centrifugal pump of small enough diameter to be lowered into the well by means of a cable. The pump itself consists of centrifugal impellers and diffusers, assembled vertically. The motor may be attached at either the top or the bottom of the pump. Capacity ranges from 20 to 13,000 bbl. per day and heads up to 13,000 ft. of fluid have been handled.

When handling the brines of certain formations in Michigan, the alloy-steel shaft and the gray-iron diffusers failed rapidly by corrosion. Since replacing the shaft with K-monel metal and the diffusers with Ni-Resist iron, the difficulty with corrosion has been completely eliminated.

# MAINTENANCE of tubular heat Exchangers

**by J. H. Housman***

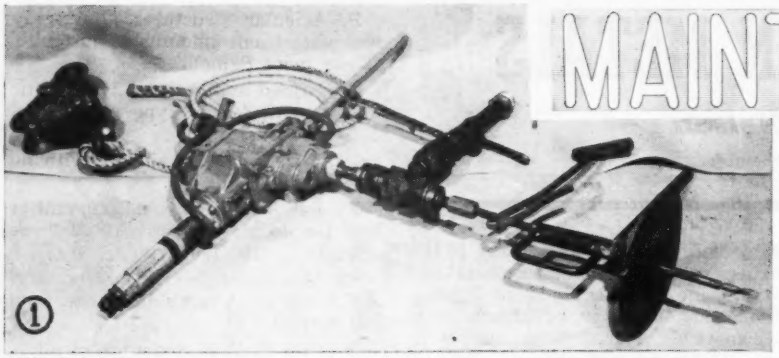

*Fig. 1—Mechanical drilling equipment*

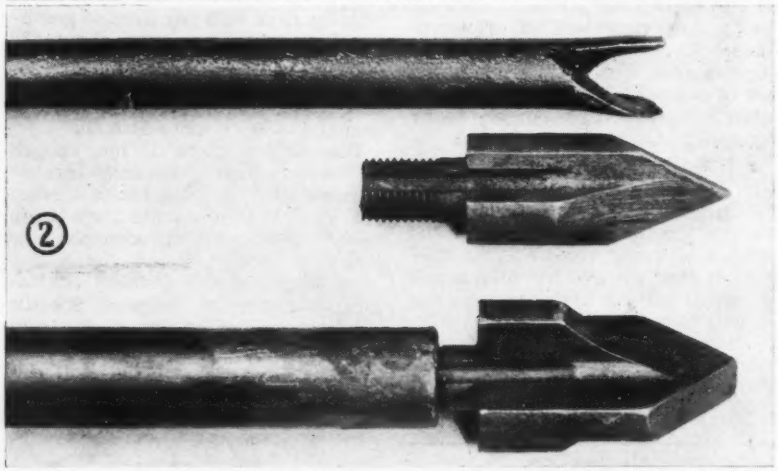

*Fig. 2—Drills used for mechanical drilling*

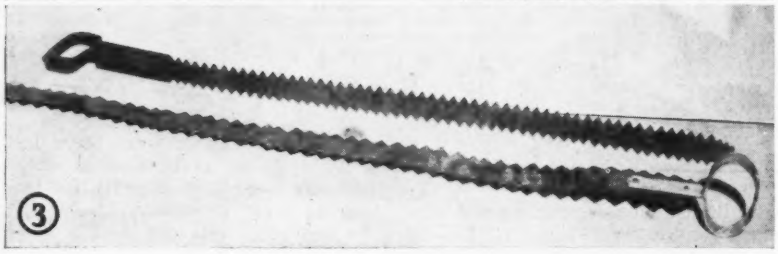

*Fig. 3—Sheet-metal saws used for cleaning the shell side of tube bundle*

TUBULAR heat exchangers are an essential part of practically all units at the Whiting refinery. Exchangers are used as coolers, condensers, heaters, and reboilers. The fluids passing through these exchangers vary from those being very viscous, such as tar, asphalt, and crude, to light gases and vapors such as naphtha vapor, hydrogen and steam. The frequency and extent of maintenance on a particular exchanger is largely dependent on the service of that exchanger, with service defined as (1) fluid combination, (2) temperature level and temperature differential, (3) pressure level and pressure differential, and (4) velocities of the fluids. Of these, the fluids and their ever-present contaminations are undoubtedly the most important and dominant factor.

A wide variety of material is used for the various parts of the exchangers, the more common ones being carbon steel, admiralty metal, chromium-molybdenum alloy steel, and high chrome-nickel stainless-steel-type alloys. The material selected originally is one which will withstand the anticipated type of corrosion, but occasionally a material change is made after some use. Such a material change is the result of unexpected or unusual corrosion or a change in the service of the exchanger.

Carbon steel is used most widely since it is the least expensive and the most readily available. It is used when the corrosion rate is relatively low, in general, of the order of 0.01 in. per year or less. Admiralty metal tubes are used in exchangers having water as one of the fluids. The use of admiralty greatly reduces scale formation on the water side and hence reduces the frequency of cleaning. Chromium-molybdenum and chromium-nickel alloy steels are used where corrosion cannot be satisfactorily reduced to permit the economic use of carbon steel.

### Basis for Maintenance

The removal of an exchanger from service for maintenance is regulated by the operating departments and the inspection department. Their basis for this removal may be (1) excessive pressure drop, (2) sufficient loss of efficiency to affect operation of the unit, (3) contamination due to leakage, (4) excessive external leakage, and (5) expected life based on previous records. Excessive pressure drop and loss of efficiency are the result of fouling whereas contamination is generally the result of corrosion. However, contamination and external leakage, and especially the latter, may be due to mechanical defects such as gasket leakage or leakage between the tubes and tube sheet resulting from faulty tube rolling. Past performance records, either with respect to fouling or corrosion, in many cases provide an accurate means of determining the necessity of maintenance work.

When a number of exchangers are arranged to operate in series, the efficiency loss of the entire group does not provide specific information as to the troublesome exchanger or exchangers. By checking the pressure

*Standard Oil Co. (Ind.), Whiting. A paper presented at the twelfth midyear meeting of the Division of Refining, American Petroleum Institute, St. Louis, June 2-3.

drop across each exchanger, the exchangers requiring cleaning can be determined. For example, the pressure drop across an exchanger may increase from 6 psi. when clean to 70 psi. when very dirty. In the case of a single exchanger, the efficiency loss is generally sufficient to determine the extent of fouling, but this is not always true. For instance, some exchanger service results in concentrated fouling only at one section, usually near the inlet or outlet. Therefore, the over-all heat transfer is not appreciably affected, but the pressure drop may be materially increased. With an exchanger in this condition, erosion may result due to localized high velocities. In one case at the Whiting refinery, a hole was eroded through the shell in the vicinity of the drain notch at the bottom of a baffle after the entire cross-section of a pass was solidly plugged in this area except for a passage through this drain notch. Also excessive pressure drop may overload the existing pumping equipment. Therefore, in general, the pressure drop across the various exchangers on a unit is periodically determined and recorded.

Contamination may or may not be serious, depending on the two fluids passing through the exchanger. For example, some leakage of crude into a reduced crude stream is not objectionable, but leakage of any substance into a semifinished product stream results in an immediate removal of the exchanger from service. In some cases contamination is permitted until the capacity of the pump or other mechanical equipment is affected.

### Disassembly Problems

A persistent source of trouble in the disassembly of exchangers has been unbolting the external flanges. With an exchanger using large and relatively few retaining bolts, it is often very difficult to supply sufficient force to break the nuts loose. The impact wrenches available for this operation are frequently inadequate. It has been the experience of our maintenance department that a larger number of small-diameter retaining bolts is much more desirable than the larger and fewer number of retaining bolts. A wide variety of bolt lubricants have been used in the past with the most common one being a mixture of graphite and high-volatile oil. However, recently a colloidal copper coating has been used with improved results.

The removal of the tube bundle is very difficult if heavy deposits exist on the shell side of the exchanger or if the baffles bind on the shell due to warpage of the tubes. Normally, the bundles are pulled by the use of a chain fall. If sufficient force cannot be applied in this manner, mechanical or hydraulic jacks are used against the floating tube sheet to supply the required additional force. These jacks are arranged so as to act between the floating tube sheet and the shell with a large wood cushion block placed against the tube sheet for protection against localized damage. In several cases even this combination of effort has not been sufficient to move the bundle. However, by removing the insulation from the outside of the shell and then striking the shell with heavy mauls, coincident with the application of the maximum permissible force, it has been possible to "inch" the bundle out of the shell.

### Cleaning Methods

Mechanical cleaning has been in the past and still is the primary method of cleaning heat exchangers at the Whiting refinery. If the shell side is relatively clean, but the tube side requires cleaning, it is not necessary to pull the tube bundle, but only to remove the channel cover, the shell cover, and the floating head cover. Steam, water, air, and mechanical drilling are used to clean the tubes depending on the type and amount of deposits, with mechanical drilling the basic operation. The drilling equipment, shown in Figs. 1 and 2, consists of an air motor, a spindle, a hollow shaft the length of the tubes, and an attachable drill.

The drill used at present is a commercial product, but in the past the end of the tube was simply ground to provide a cutting edge as shown in Fig. 2. A monorail is erected parallel to the tube bundle to support the air motor, spindle, tube, and drill assembly. Air, water, or steam is transmitted through the spindle and the hollow shaft to carry the deposits out of the tube as the drilling progresses. The funnel-shaped shield, through which the hollow tube extends, protects the operators from the dirt which is blown out of that end in the event of a plugged tube. After completion of the drilling, the inside surfaces of the tubes are usually sandblasted.

For mechanically cleaning the shell side of the exchanger, it is necessary to remove the tube bundle. The bundle is generally cleaned immediately outside of the shell while rest-

SHELL CORRODED AT THESE BAFFLES
NOTE HEAVY DEPOSIT ON TUBES
5
CT-18 EXCHANGER BUNDLE
TOLUENE UNIT
DURING RUN Nº10 7-8-44 AT 5340 HRS. OPER.

*Fig. 4—A severely fouled tube bundle. Fig. 5—Heavy deposits on shell side of a tube bundle*

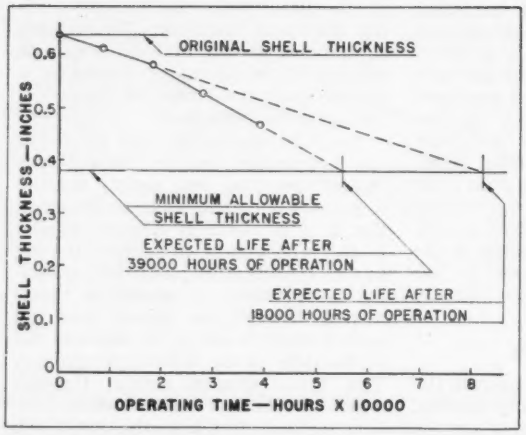


*Fig. 6—A graphical method used to predict remaining life of exchangers*

*Fig. 7—Leaking tubes of bundle plugged at floating tube sheet end*

ing on a permanent or temporary platform. If the deposits are concentrated and cannot be removed by a water or steam wash, large "saws," shown in Fig. 3, are used to remove the major portion of the deposits. These saws are made from soft sheet metal and are of sufficient length to pass through and extend beyond the bundle. The main difficulty with this method occurs when attempting to remove gummy deposits since these deposits tend to accumulate on the inaccessible portions of the inner tubes. The inside of the shell is cleaned by sandblasting.

The cleaning of exchangers has not been confined entirely to mechanical methods. Various chemical and hydraulic methods have been tried with fairly good success. The most successful of these has been a simple hot water wash with the exchanger left completely assembled. Of course, this method is limited to deposits which are water soluble. Additional experimentation is contemplated for the future and it is expected that in general the cleaning time will be reduced.

Extensive fouling consists primarily of salt or coke deposits. The salt deposits occur almost exclusively during the preheating of crude. These salts remain in solution until the crude reaches the vicinity of 300° F. As the temperature rises, increasing amounts of salts are deposited in the passages. Thus, when a group of exchangers are in series and used to preheat crude, the worst fouling generally occurs in the last exchanger. Also, with the refining of increasing amounts of West Texas crude, having a greater salt content than the other crudes, the fouling of crude exchangers has appreciably increased. Desalting equipment is being or has been installed on units which formerly did not require such equipment. For example, from May to September 1944, a mixture of Mid-Continent and West Texas crudes, the mixture containing about 17 per cent of the latter, was processed in our No. 370 combination cracking unit. The crude was not desalted and, even with the low percentage of West Texas crude, the fouling of the higher-temperature crude exchangers increased to such an extent that this method of operation was abandoned until desalting equipment could be installed. The corrosion rates also showed a marked increase during this period of operation. Examples of severely fouled heat exchanger tube bundles are shown in Figs. 4 and 5.

### Inspection

All exchangers which are partially or completely disassembled are inspected by the inspection department. The inspection consists of a visual check, physical measurements, and when found necessary, magnaflux examination. The use of magnaflux examination has been confined to the inspection of welds. The extent of the physical measurements depends to a large extent on the visual check. In cases of a complete disassembly, however, all of the component parts are at least spot checked, primarily as a basis for determining corrosion rates. Fig. 6 illustrates a graphical method used for this determination. In general, a large number of measurements are made and the maximum corrosion rate is used to predict the remaining life. After the inspection, the corrosion rate for each exchanger is revised and the expected life predicted.

A report on all such inspections is issued covering the general condition, corrosion rates, expected future life, and repairs or replacements recommended. After a number of inspections have been made on a particular exchanger, these inspection reports constitute a reliable basis for determining frequency of cleaning, expected life of each part of exchanger, and desirable material changes.

### Repairs

All minor repairs on exchangers are performed in the field. Field work includes rerolling leaky joints, various minor welding repairs, plugging leaking tubes with solid tapered plugs, and the replacement of removable parts. Fig. 7 shows a tube bundle in which the leaking tubes have been plugged to permit a limited amount of additional operation before retubing.

When a major repair is required, such as completely or partially retubing a bundle or remachining gasket surfaces, the parts concerned are removed from the unit for repair in the machine shop. Facilities for remachining a gasket surface of a tube sheet with the tubes intact are planned for our machine shop, but at present this work on a tube bundle is performed by outside shops.

### Reassembly

The reassembly of exchangers is relatively trouble free since the shell and tube bundle are clean, and interference between the baffles and shell can be removed by grinding the baffles. However, gasket leakage is occasionally found during the hydrostatic test. In most cases it has been found more satisfactory to reuse the gaskes if they are in good condition than to replace them with new ones. The asbestos-filled gaskets are sometimes preferred over the solid soft steel and straight asbestos gaskets. However, all three types have been used. Occasionally it has been necessary to cut our own gaskets from sheet metal stock.

# INSIDE STORY

The coupling has been partially cut away in this illustration to better reveal the secret of strength in every Jones Joint.

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## Water-Injection Program At Haynesville

*(Continued from page 81)*

at the state line to arrest pressure drop in Arkansas as soon as possible.

Preliminary plans calling for injection of 15,000 bbl. of water daily have since been revised to provide water input at the ultimate rate of 20,000-25,000 bbl. per day. At the present time, eight wells are injecting water at the rate of 5,600 bbl. per day.

Relatively little outlay is required to begin the water-flood program. No injection wells need be drilled. Producing wells picked for water injection are reworked and reacidized, using an average of 6,000 gal. (See Fig. 3.) The Pettit lime responds well to acid treatment, and reacidizing input wells greatly reduces the resistance to water entry immediately around the well bore. Water will be injected through both tubing and casing.

Fresh water from a 90-ft. sand section encountered at about 600 ft. is available in the field in quantities believed sufficient to flood the entire unit. The purity of the water and closed system will obviate treating and filtering. Water distribution from wells at the plant site will be served by 2½-mile, 8-in. main to the north end of the unit, a 1½-mile lateral to the west flank, and about 9½ miles of smaller lines serving 23 wells.

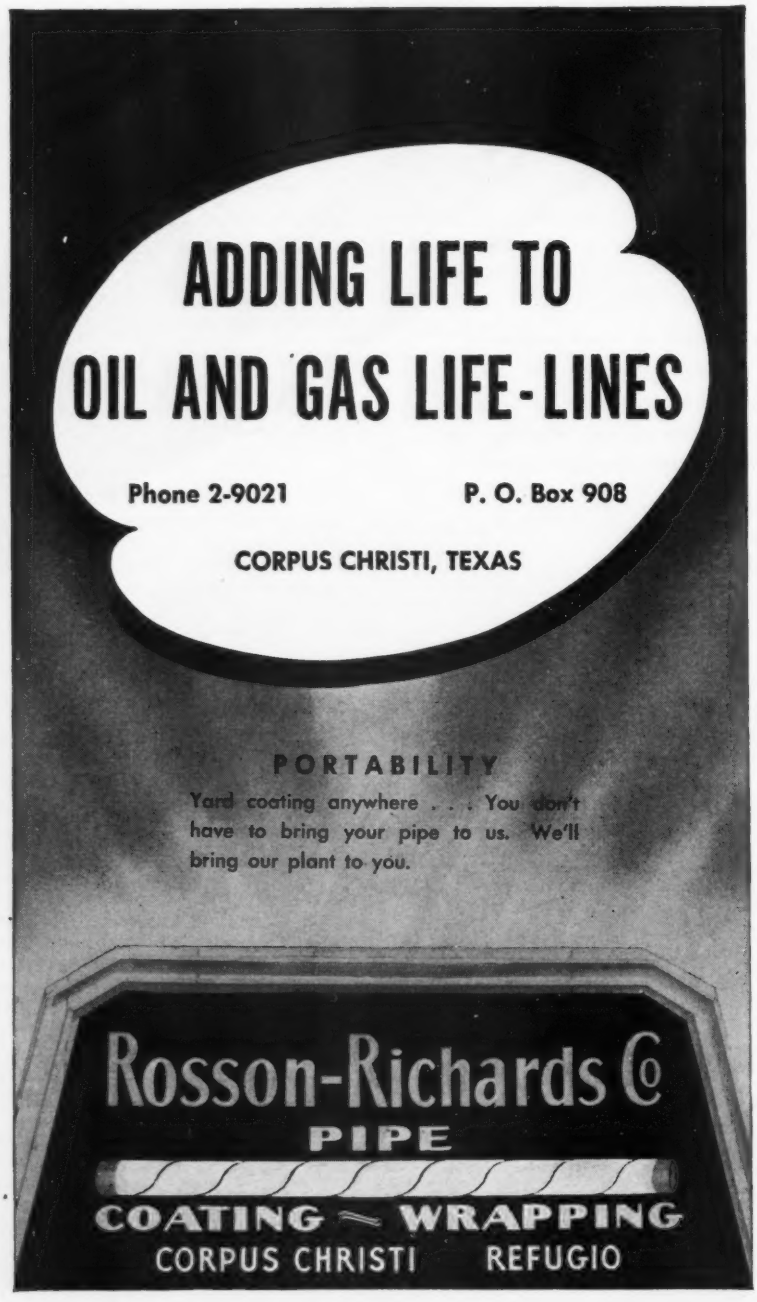
### Uniform Water Front Indicated

Haynesville is a stratigraphic trap superimposed on a structural high of low relief, therefore gravity is expected to have little effect on advance of the water through the porous lime sections. A uniform water front is indicated by the relative thinness and uniformity of the porous sections. The upper Pettit zone which contained 85 per cent of original oil in place shows weighted averages of 9.33-ft. thickness, 19.7 per cent porosity, and permeability ranging generally between 20 and 28 md. Both horizontal and vertical permeability are fairly uniform throughout the field and highly permeable streaks which might promote channeling have not been found to date. Initial water injection at gradually rising pressures bears out the indication that water advance will be uniform through the porous zones.

Flooding of the upper Pettit will be complicated by its division into two sections over about two-thirds of the field's area. The upper, or "A" section, contains about three-fourths of upper Pettit reserves. The "A" and "B" sections are common in the north part of the unit and efficient flooding of the upper Pettit in the Arkansas sector is expected. The water advance to the south, however, will encounter the divided sections and may be hard to control.

Limited operation of the water-injection program to date tends to bear out the prediction that after movement of oil and gas through the reservoir has begun, injection pressures will approximate 2,500 psi. at injection rates of 1,000 bbl. of water per well per day. A horizontal flood efficiency of 80 per cent is believed possible and it is further expected that the unit can continue economical operation until the withdrawal ratio of at least 2 bbl. of water per barrel of oil is reached. Without allowing for the decrease in operating life of the unit, returns in added production, after taxes and royalty payments, may be substantially increased.

The project is being initiated under the direction of H. B. Johnson, general manager of H.O.C., and P. S. Ervin, chief petroleum engineer for the committee. Those interested in details of the Haynesville water injection program are referred to a paper which was presented by Ervin at the Mid-Continent district American Petroleum Institute spring meeting in Amarillo, May 22 and 23.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# Baash-Ross News

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OUR 27th YEAR

## Another New Baash-Ross Product...

The Baash-Ross Hinged Casing Spider (below) closed and ready for use. Split Spider Bushings (right) lock in place to adapt Spider for smaller pipe sizes. Baash-Ross Type "UC" Casing Slips (top) are recommended for handling casing 7⅝" O.D. and larger. (For smaller pipe use Baash-Ross "DU" or "2MB" Rotary Slips.)

*A Universal Casing Spider that meets every Casing Handling Requirement!*

### The BAASH-ROSS HINGED CASING SPIDER

**THERE HAS long been a need for a lightweight heavy-duty casing spider universally adaptable to practically any pipe-handling requirement. And here it is—The Baash-Ross Hinged Casing Spider. Though light in weight, it will safely support the longest and heaviest casing strings. And note its wide-range adaptability . . .**

- You can place it directly on top of any type or size rotary table for supporting casing strings too large to be run through standard rotary master bushings. No need to remove the rotary table, no wasted time disconnecting the table drive and then reinstalling and realigning the table hook-up.
- Or, if preferred, you can use the Hinged Casing Spider on a platform that replaces the rotary machine.
- Or on workover, salvage and other operations where no table is installed, the Hinged Spider can be supported directly on cribbing, thus providing a quick and convenient method of handling casing and other pipe.

**HINGED FOR QUICK EASY INSTALLATION**

By simply pulling a pin, the Baash-Ross Hinged Casing Spider can be quickly opened, thus permitting its installation without need for stripping the unit over any pipe that may be hanging in the well. The double pin arrangement not only permits the Spider to be opened on either side, but also permits the Spider to be separated into two parts for maximum ease in handling and transporting. Hinge pins as well as handles are streamlined into the body contours, while a generous slip-supporting platform and safety grid, low overall height and wide solid base all contribute to maximum safety and crew convenience.

### MAXIMUM CASING ADAPTABILITY

Wide-range installation adaptability is only *one* of the features in the Baash-Ross Hinged Casing Spider, for it is equally adaptable to handling a complete range of pipe sizes 18⅝" O.D. and smaller.

**The Spider is made in *four* basic sizes . . . 18⅝", 16", 13⅜" and 10¾" . . . and each basic size will not only handle the diameter of casing corresponding to its size designation, but can be readily adapted to handle any smaller size of casing by simply inserting removable Spider Bushings.**

These Spider Bushings are split and are retained solidly in place whether the Spider is open or closed. And regardless of the basic size, each Casing Spider can be bushed down, if desired, to the bore and taper of a standard rotary master bushing, thus permitting the use of standard rotary slips for handling small casing as well as any other pipe sizes that can be supported in regular rotary slips.

**Get full details on this new Baash-Ross Hinged Casing Spider from your nearest Baash-Ross representative—or write direct for additional data.**

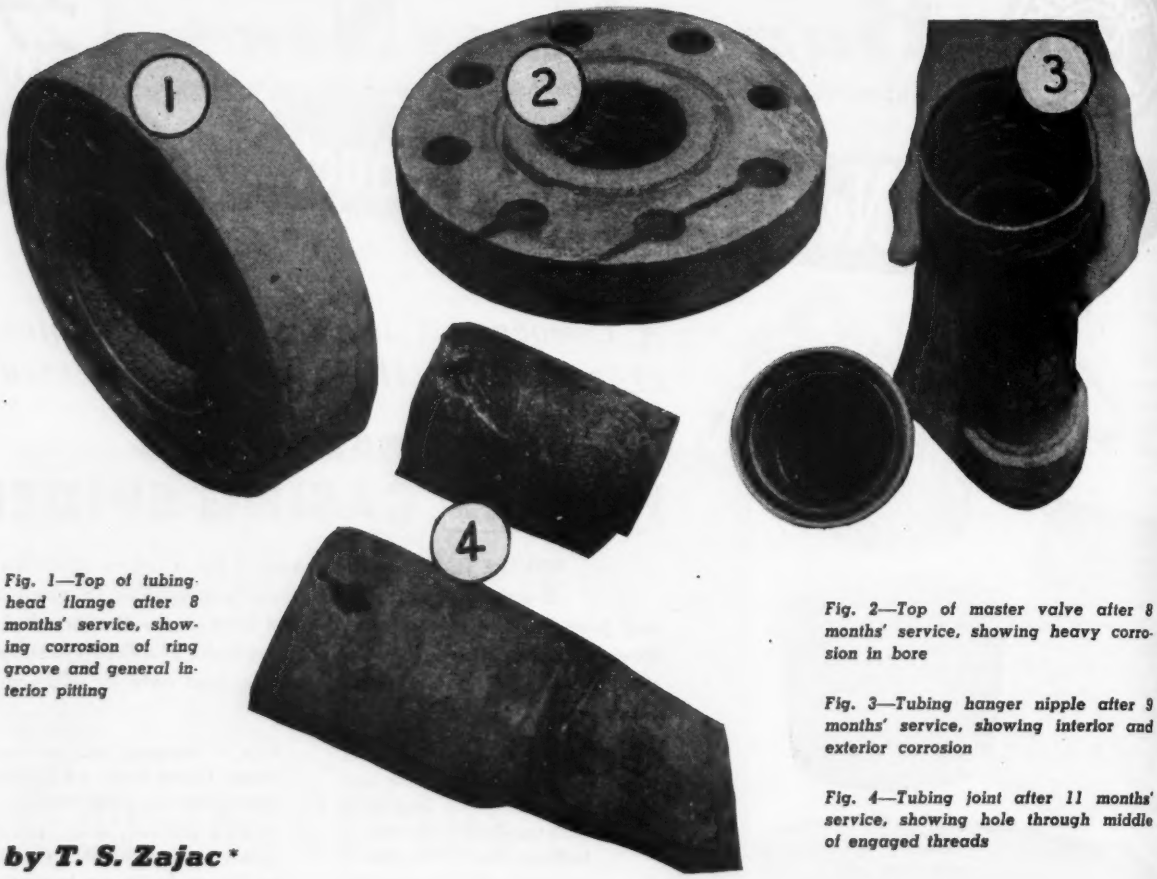


*Fig. 1—Top of tubing head flange after 8 months' service, showing corrosion of ring groove and general interior pitting*

*Fig. 2—Top of master valve after 8 months' service, showing heavy corrosion in bore*

*Fig. 3—Tubing hanger nipple after 9 months' service, showing interior and exterior corrosion*

*Fig. 4—Tubing joint after 11 months' service, showing hole through middle of engaged threads*

**by T. S. Zajac***

# CORROSION— in High-Pressure Gas-Condensate Wells—Gulf Coast Area

**Part 1 of 2 Parts**

## Introduction

DURING the past several years, corrosion in high-pressure gas-condensate wells has come to the fore as an operating and economic problem for organizations producing from deep high-pressure gas-condensate reservoirs. Corrosion as a problem is, of course, an old one. The petroleum industry has always been confronted with certain phases of this problem, and the corrosion of high-pressure gas-condensate well equipment can be considered as a comparatively new phase of an old problem. In the past, the corrosion of oil-field equipment was accepted more or less as a routine maintenance problem. The seriousness of gas-condensate corrosion, however, is such that it cannot be neglected nor should it be underestimated. It is a proven problem that the industry cannot avoid. It presents continued hazards and appreciable economic losses to the operator. Whereas the life of oil-well equipment is gaged in terms of years, the life of gas-condensate well equipment frequently is a matter of months and in some instances of days. The high pressures encountered in this type of production, up to 6,000 psi., make any weakening of the well equipment by corrosion extremely hazardous.

Losses due to high-pressure gas-condensate corrosion are not confined to frequent replacements of equipment alone, but also include expensive remedial operations, loss of production, and even the probable loss of a well, damage to the reservoir, or loss of life. The recent voluminous technical and general literature relating to this type of corrosion attests to the importance of this serious problem. The following will cover the history, scope, causes, characteristics, cooperative work done by the industry, field methods of corrosion prevention, cost, and future work to be done on gas-condensate well corrosion. It is hoped that this article may be of some aid to the operator who has not yet come into real contact with this type of corrosion and that it will assist in stimulating the interest of such operators toward activity that will be of mutual benefit to all concerned.

## History[1,2]

The problem of high-pressure gas-condensate well corrosion was first publicly described by Bacon and Brown[3] before the Natural Gasoline Association of America in April 1943. Sufficient concern regarding the

*Shell Oil Co., Inc., Houston.

problem had accumulated by late 1943 to cause the first organized attempt by various interested parties to gain more general knowledge as to the causes of this type of corrosion and to the development of methods of protection against it. In early 1944 both the N.G.A.A. and the American Petroleum Institute organized high-pressure gas-condensate well corrosion committees for this purpose. The N.G.A.A. solicited contributions from the various operating companies and therewith initiated a research program for the purpose of investigating the causes and means of prevention of this type of corrosion. To avoid duplication of effort and to obtain the most satisfactory and complete results in the minimum of time, the A.P.I. subcommittee on corrosion of high-pressure production equipment, a similar committee organized by the National Association of Corrosion Engineers, the U. S. Bureau of Mines, and the research departments of many of the producing companies joined into active cooperation with the N.G.A.A.-sponsored research program. This cooperative undertaking has now been in progress for approximately 3 years.

### Scope

It has been reported that there are now in operation approximately 100 condensate fields in the Gulf Coast area. A few of these fields are over 10 years old; however, the majority have been brought in during the last 7 years, and many have been produced only in the last several years. Therefore, as far as the oil operator is concerned, condensate-well corrosion is a development of the last few years. From data compiled by the A.P.I. in April 1944, 24 out of 53 fields were reported as corrosive. In April 1946 a similar A.P.I. survey reported 47 fields corrosive, 15 fields noncorrosive, and 31 fields did not report any information as to the corrosiveness of their production. Approximately 10 of the fields reported as noncorrosive in 1944 were reported as corrosive in 1946. West,[1] in his summary of the A.P.I. data, states, "It appears safe to say that over two-thirds of all the present producing condensate fields are corrosive. About one-third of the corrosive fields are seriously corrosive and about two-thirds are moderately or only slightly corrosive. Fields considered seriously corrosive are those in which tubing strings, tree fittings, or flow lines receive sufficient corrosive attack to necessitate their renewal in the order of once a year." At the writing of this present article, it is probable that the ratio of corrosive to noncorrosive fields has increased over that reported in 1946. Principally, because as markets for the lighter hydrocarbons have increased, many fields have been produced much more heavily and because operators as a result of the publicity on the gas-condensate well-corrosion problem, have been checking their equipment for corrosion. It further is reasonable to assume that as the depth of petroleum discoveries increases, the number of gas-condensate-type reservoirs will also increase, and the condensate-well corrosion problem will broaden in scope.

### Causes of the Corrosion[4,5,6,7]

On the basis of studies to date, it appears that the corrosive action in gas-condensate wells is most likely caused by carbonic acid or the lower fatty acids, or by a combination of both. Laboratory investigations conducted by the Bureau of Mines, Battelle Memorial Institute, and various oil companies have indicated that the action of carbonic acid alone is sufficient to cause the kind of corrosive attack that takes place in the average corrosive condensate well. Laboratory investigations have also shown that the rate of corrosion is increased by the additions of the lower fatty acids, comparable to the concentrations of these acids found in produced condensate well waters. The result of these studies plus the fact that most other possible causative agents have in one manner or another been ruled out are the principal reasons to conclude that condensate-well corrosion is an acid corrosion and probably caused by either carbonic acid, organic acids, or a combination of both.

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Even though evidence points toward the fact that the corrosive action in condensate wells is caused by either carbonic acid or organic acids, the presence of considerable amounts of one or both acids in the produced waters does not necessarily mean that the produced waters will be corrosive.[8] This has been the case in several noncorrosive fields, and it has been proposed by Mackerman[9] and others, that in such cases some natural inhibitive agent is present in the produced well fluid which creates a protective film over the metallic surfaces or that a film of corrosion products is laid down and thereby prevents further corrosion. In addition to the above anomaly, the problem of condensate-well corrosion is greatly complicated by a multiplicity of variable factors affecting corrosion. Some of these are: ratio of liquid condensate to liquid water in the well fluid, well pressure, well temperature, fluid velocity, composition of the hydrocarbon fluid, carbon dioxide content of the well fluid, organic acid content of the well fluid, mineral content of the well fluid, condition of equipment installed in the well, method of well completion, as well as other presently undetermined factors.

The N.G.A.A. corrosion research project committee[2] has concluded on the basis of presently available information: "Any gas-condensate well producing from a formation more than 5,000 ft. in depth, at a reservoir temperature above 160° F., and a pressure above 1,500 psi., may show corrosive attack if the gas contains carbon dioxide in excess of 0.2 per cent by volume." The above statement, however, does not include the factor of velocity and many wells which display noncorrosive properties at relatively low flow rates, become severely corrosive at flow rates of the order of 4 to 10 M.M.c.f. per day. For this reason, it is felt that it would be desirable for the N.G.A.A. conclusion to contain also a qualifying statement as to the range of velocities at which corrosion is most likely to be expected.

### Characteristics of the Corrosion[10]

The first and most important factor to be considered in attacking the high-pressure gas-condensate well-corrosion problem is where and to what extent the actual corrosion occurs. Generally, field inspections have revealed that the well-head equipment and the producing string receive the greatest amount and the most severe attack, but this is not always the case.

The degree of corrosion that has been found in christmas-tree fittings of condensate wells usually is more severe than that found in the producing strings. The corrosion is especially severe on such fittings as chokes, ring gaskets, valves, etc. Of all the tree fittings, the well choke usually receives the greatest amount of corrosive action, and this is undoubtedly due to a combination of corrosion and erosion, rather than corrosion alone. Generalizing further, corrosion is usually more severe on the downstream side than the upstream side of equipment, and especially where changes of cross-section occur, indicating that turbulence also plays an important part in the severity of corrosion. Figs. 1 and 2 are examples of corrosion found in a tubing head and valve after approximately 8 months of service.

Corrosion in the producing string generally concentrates itself in and around the joints and usually more prominently on the downstream side of the joints. However, in cases, the action has been found spread over comparatively large areas of individual tubes. It appears that the attack starts with the formation of small pits. These pits apparently grow in area and combine with other corroded areas so that often large internal areas of surface are somewhat uniformly eaten away. Many tubing strings have been pulled during the last few years, to find that tubing wall thickness has been reduced to an unsafe value. In extreme cases corrosion to near perforation has been known to occur in several months.

Producing-string corrosion is generally the greatest near the surface of the well. It is not, however, limited


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to this location as some strings have experienced attack over their entire length of 10,000 ft. or more. In such cases, the severity of the corrosive action increases from the bottom to the top of the well. As previously stated, the corrosive action generally occurs in the form of pits and in some cases to the extent of eating away the entire surface. On the other hand, the corrosive action often takes peculiar shapes such as forming rings on the periphery of the tube wall, long longitudinal valleys on the tube wall, or small continuous worm-eaten holes. Figs. 3 and 4 are representative of corrosion experienced in a tubing-hanger nipple and a tubing joint after approximately 9 months and 11 months of service, respectively.

The foregoing discussion of producing-string corrosion has been confined to internal effects found in tubing strings of wells producing through the tubing only. Where wells have been completed as dual producers from two different zones and produced simultaneously through tubing and tubing-casing annulus, or where the same production is obtained simultaneously by flowing through tubing and tubing-casing annulus, corrosion effects have also been found on the exterior of tubing strings, and the interior of the casing strings.[11] In such cases the external corrosion on tubing has been found to be most severe on couplings and exposed threads. Mill scale on tubing appears to be completely removed in less than 1 year.

### Casing Corrosion Less Severe

Although little is known concerning the actual condition of casing in condensate wells, it is logical to assume that since the casing is exposed to the same fluids as the tubing, it also will be suffering corrosion. Because of lower flow velocities, however, corrosion in the casing strings should be less severe than that experienced in the tubing strings. This is partly borne out by the experiences of one operator.[11] A string of 5½-in.-o.d. full-length liner, pulled after approximately 4 years of service, showed the lower half of the pipe to be unaffected. Internal corrosion, however, was found in the upper half, and the pitted condition resembled that occurring on the inside of tubing.

Most of the pitting found was concentrated within an area 24 in. of the male or down end of the casing joint. The top 1,200 ft. of this string was severely corroded. A number of holes were present in the ends of the joints in the threaded sections, and approximately ½ in. of the ends of several joints had corroded away. Internal corrosion of casing has also been reported in other fields. Often casing corrosion in the form of fairly well-defined pits can be found just below the tubing head.

High-pressure gas-condensate corrosion is not confined to christmas trees and producing strings alone. Severe corrosion also is frequently experienced in the meter runs and flow lines of wells. Cases have been reported wherein the entire lengths of flow lines from the well to the cycling plant have had to be replaced because of corrosion. This phase of the producing equipment has, to date, had the least in the way of proper inspection and many more such flow-line replacements will undoubtedly have to be made in the future.

Few, if any, serious cases of this type of corrosion have been reported as taking place in cycling-plant equipment. Although there is no reason to believe that cycling-plant equipment will be totally immune to this type of corrosion, especially since well equipment is not, it is logical to believe that the action if any should be less severe and less extensive than in well equipment. This, mainly, because the liquid water is early separated and withdrawn from the plant processing stream and because flow conditions are such as to minimize velocity and turbulence effects due to throttling of the gas stream.

Likewise no corrosion in the lines or well-head equipment of injection wells has been reported to date. Christmas tree fittings on injection


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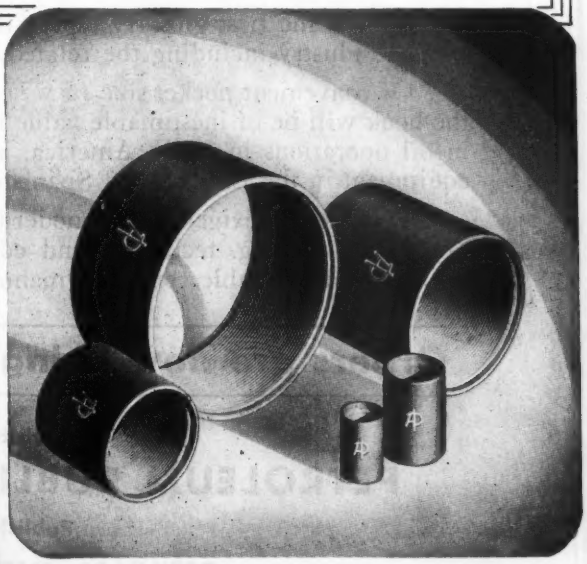

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wells in several fields have been inspected after appreciable service, and no signs of corrosion were evident. This lack of corrosion is probably attributable to the fact that the injection gas is dry with respect to liquid water. It is of interest to mention that this injection gas upon being reproduced, where channeling of the injected gas has occurred, has produced corrosion effects in extraction wells whereas the original produced fluid did not.

### Cooperative Work Done

The N.G.A.A., A.P.I., N.A.C.E., U. S. Bureau of Mines, and many of the oil companies are cooperating through the N.G.A.A. corrosion research project committee to obtain a solution to the condensate-well corrosion problem. In general, the N.G.A.A. is the sponsoring organization for the corrosion work being conducted on both causative and preventive research as well as for the investigation of field corrosion-prevention measures. Much of the research work on the problem has been done jointly by the U. S. Bureau of Mines, University of Texas, and Battelle Memorial Institute, under contract to the N.G.A.A., and cooperatively financed by the interested oil companies.

In addition to the above work, the individual companies have done and are continuing to do much research and field investigation on the problem. The A.P.I. and the N.A.C.E., respectively, are primarily conducting surveys to determine the cost and extent of condensate-well corrosion, and tests of metals and alloys in search of materials with better corrosion resistant properties. The general knowledge on the subject of gas-condensate well corrosion has increased tremendously because of this cooperative work and many of the research results obtained both from the laboratory and the field have been gratifying. The practical solutions to the problem, however, are still far from complete.

Because of the seriousness of gas-condensate well corrosion and the investments involved, most producing organizations have instigated rather extensive field corrosion-prevention programs. A discussion of these programs and some phases of future work to be done will appear in a second installment to appear in a later issue.

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## Gulf Announces New Oils

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# New Drilling Method Demonstrated by Inventor Using Working Model

**by Leigh S. McCaslin, Jr.**

THE first working model of a radically new method of drilling oil wells is now being tested in Bartlesville, Okla., by the newly formed Electrodrill Corp. A. Arutunoff, designer of the Reda submersible pumping unit and president of Reda Pump Co., is the inventor of the new method and president of Electrodrill Corp. Arutunoff emphasizes that the Electrodrill is in its initial stage of development and has not as yet been field tested, although it has performed up to expectations in experimental tests.

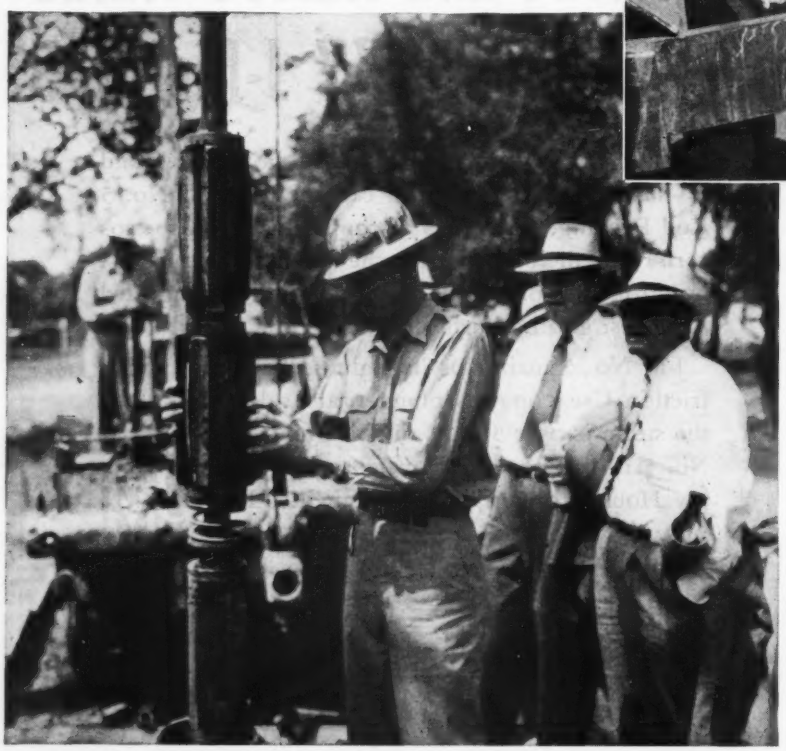
As shown in the diagram, this new method consists of drilling with an electric-motor-driven unit which is lowered into the hole by a power cable from an ordinary winch. The hole is filled with sufficient liquid to cover the drilling unit and a circulating pump, incorporated in the unit, circulates liquid through a conventional rotary bit and deposits the cuttings in a bailer which is also a part of the unit. The amount of hole that can be made without pulling the unit depends on bit wear and the capacity of the bailer. Presently contemplated bailers will make it necessary to pull the unit once for every 30-60 ft. of hole made to dump the cuttings.

The junk basket on the top of the assembly is a means of determining the condition of the walls of the hole. Sloughing will be indicated by samples obtained in the junk basket. Since there will be no mud to strengthen the walls of the hole, sloughing will present a problem. The developers of the Electrodrill plan to use an underreaming bit through sloughing formations, spot quick-set cement, and then drill through it.

All of the equipment, except the main shaft and bit, is prevented from rotating by the friction dogs shown in the drawing. The initial rotation of the shaft and bit causes these dogs to set in the wall of the hole. The dogs consist of knife-like blades approximately 14 in. long on a free pivot. Upward or downward motion unseats the dogs readily allowing the equipment to be pulled or to drill deeper. The swivel is a safety precaution to prevent a twistoff of the cable in the event the dogs fail to function.

Tests have indicated that conventional coring can be done as fast as drilling, which will provide a core from top to bottom of wells drilled,

*Right: Two-man drilling crew and Sergei Arutunoff, son of the inventor, examine cuttings which have just been emptied from bailer of the Electrodrill unit. Note large size of cuttings. A 4-in. square steel door with a spring-loaded bolt serves as the means of emptying the bailer. Crew consists of William F. Province, and Lou R. Schafer*



*Left: Bert Sutton, Jr., secretary-treasurer of Electrodrill Corp., explains operation of the friction dogs to a group of engineers and trade journalists. Initial rotation of the main shaft and bit causes these knife-like blades to expand and take hold in the walls of the hole preventing the unit from rotating. Below the dogs can be seen the holes which admit cuttings to the top of the bailer*

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if desired. A two-man crew is sufficient to operate the equipment. The driller can slack off on the cable and let the unit drill ahead by itself. The use of the Electrodrill for a completion job is being contemplated as the initial field test of the equipment.

### Working-Model Details

The first working model has drilled 169 ft. of 6⅛-in. hole in the yard of Reda Pump Co. in Bartlesville, using an 84-ft. derrick. A standard 17½-hp., 3-phase, 60-cycle, squirrel-cage, induction-type Reda motor, as used in its pumping units, has been adapted for the drilling unit. Public-utility power is being used at present, but it is anticipated that a motor-generator set will be used under field conditions. The model weighs 1,700 lb. and has an over-all length of approximately 60 ft. For the tests, a 1,000-lb., 14-ft. by 5¼-in. drill collar has been used. It is placed immediately above the bit and rotates with it, thus lending a stabilizing effect to the drilling. Any required number of drill collars can be used. Using the single drill collar, shaly limestone was penetrated at the rate of 28 ft. per hour. The equipment is designed so that a 14-in. jarring motion can be obtained between the drill collar and the nonrotating member above. This provision is made to free a stuck bit or drill collar.

A set of planetary gears reduces the motor speed of 3,600 to 300 r.p.m. on the bit. The small circulating pump has a capacity of 120-180 gal. per minute and the test model bailer is 20 ft. long.

Arutunoff has designed a special cable for use with the Electrodrill. It consists of three conductors insulated with buna-N rubber as a core and a covering of two layers of 24 preformed steel wires each. The largest cable manufactured to date is 13/16 in. in diameter and designed for drilling to depths of 8,000 ft. Cable strength is the only limitation on depths to which the unit can drill, the developers believe, and Arutunoff has designed a uniformly tapered cable which is capable of depths to 16,000 ft. The motor can stand the temperatures of such depths.

### Description of Sidedrill

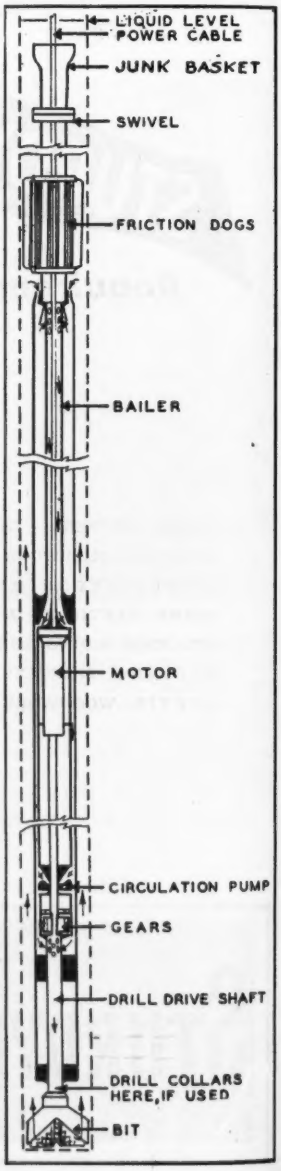
All of the inventions of A. Arutunoff, pertaining to oil-well drilling and servicing, are assigned to Electrodrill Corp. These include an interesting new development, termed a Sidedrill (see pictures), which can be used for sampling, drilling casing, or drilling formation. The Sidedrill uses a similar but smaller motor than the Electrodrill. A specially designed bit is fastened to a flexible-steel shaft which is whipstocked by a device incorporated in the unit. The weight of the motor, flexible shaft, and a main shaft are on the bit. Bit sizes of 13/16 and 1⅝ in. have been used to date and the unit can drill 4-8 ft. out into the formation. Over-all length of the unit is 15 ft. The drill can be spotted at any depth in a hole by the use of a shoe on the bottom of the unit. This shoe is set hydraulically against the casing or wall of the hole by a pump incorporated in the unit. In preliminary tests, the Sidedrill made hole with ease through 6⅝-in. N-80 drill pipe, 7½ in. of neat cement, and the steel drum containing the cement. The development of the Sidedrill was occasioned by a gas well on which considerable difficulty was encountered in shooting through casing and cement to open up a new producing zone.

### Russian Drilling Unit

Despite speculation to the contrary, the Electrodrill is not similar to equipment the Russian Government has designed and is using with Reda motors. Reda is supplying the Russians with a 3-phase, 10-pole, 50-cycle, 160-hp. motor which is 9⅝ in. in diameter and 28 ft. long. Equipped with a 12¼-in. bit, this unit weighs 3 tons. The unit is run on drill pipe, not a cable as with the Electrodrill, and mud is circulated as in conventional rotary drilling. The mud circulating through the rotor shaft of the motor acts as a coolant. The major difference between the Russian system and standard rotary is that the drill pipe does not turn, thus eliminating considerable wear. It has been unofficially reported that the Russians have drilled to 3,000 meters with this type equipment.

## Perchloric Acid Data Sheet

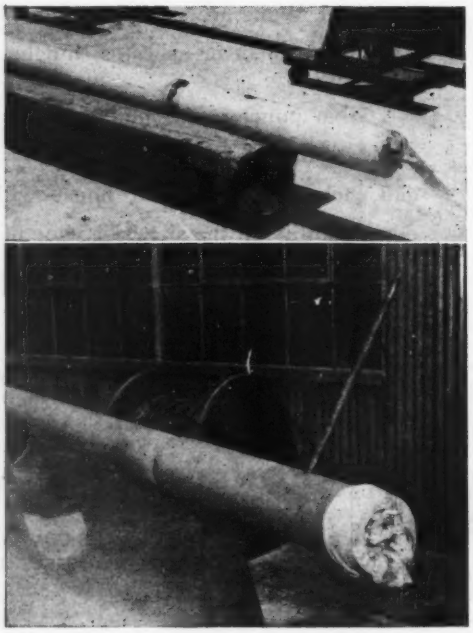
A chemical-safety data sheet on perchloric acid solution, the eleventh of a series of chemical-product safety manuals, has been published by the Manufacturing Chemists' Association, 608 Woodward Building, Washington 5.

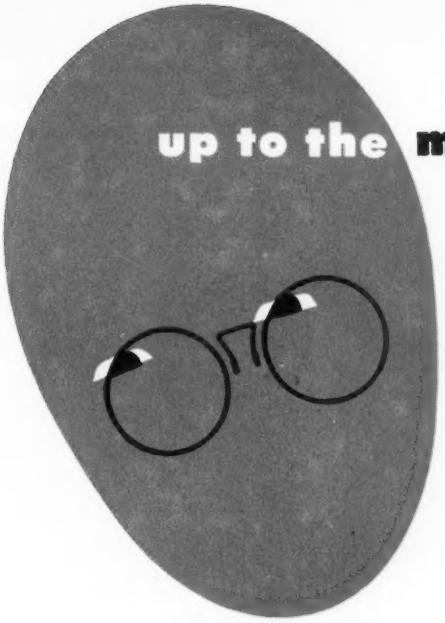



*Right: Diagrammatic sketch of the Electrodrill*

*Below, top: Shown here is the Sidedrill unit which is used for sampling, drilling casing, or drilling formation. The hole through which the bit emerges to penetrate the formation or casing can be seen in the top of the unit. The apparatus on the bottom of the unit is a shoe which is set hydraulically to hold the unit at any desired depth in the hole*

*Bottom: Here the bit and flexible shaft are extended from the unit as they would be in actual drilling operations. (The shoe, as seen in the top picture, has been removed and the end of the unit covered by a rag)*



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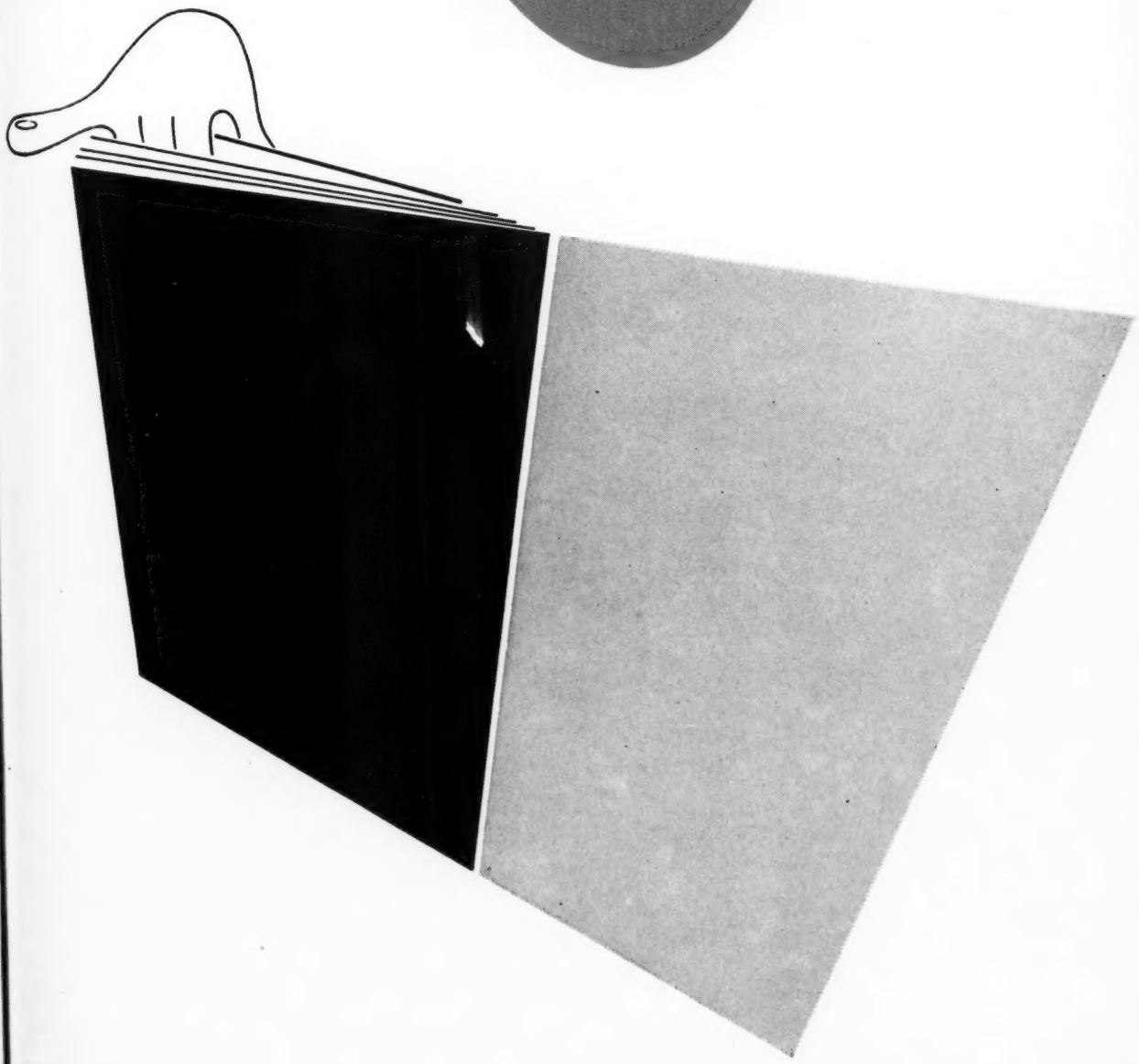

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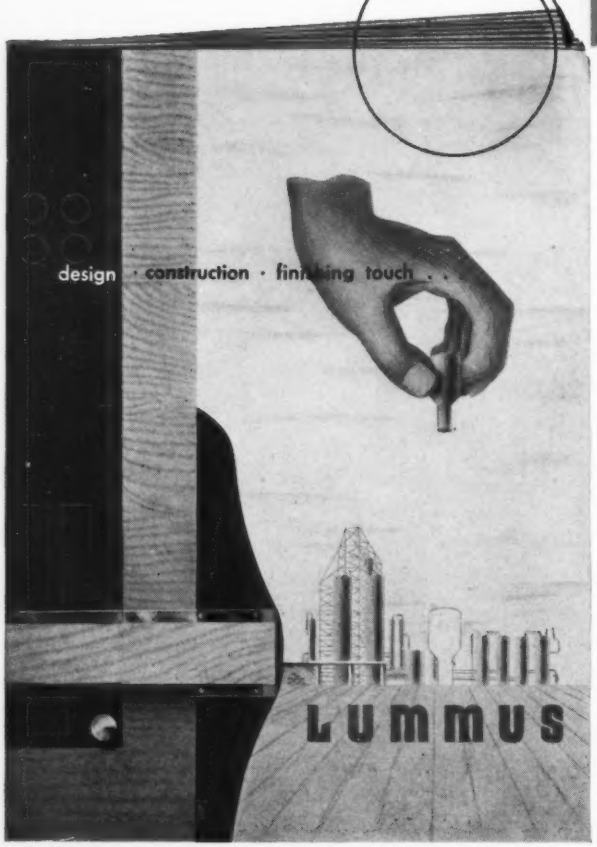


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# Effect of Bacteria on Oil Production

*(Continued from page 79)*

velopment of practical applications. Pure science, yes; commercial application, no.

The work at Scripps Institute was carried on until results reached the stage where the A.P.I. considered it advisable to protect such potentially great discoveries. A certain amount of information was fairly well known in a limited circle, but not being in the nature of a military secret, it was considered at least possible that some unscrupulous person might get hold of some of the information and try to exploit it by securing a patent.

Therefore, Dr. ZoBell applied for a patent, with the American Petroleum Institute designated as assignee, and A.P.I. in turn dedicating it free of royalty to the public throughout the world. The patent was granted as applied for, and now the results of this discovery are available free to anyone and everyone who wishes to develop commercial applications.

The patent, No. 2,413,278, reveals the following discoveries about certain strains of bacteria:

1. They have the power to strip an oil film from around the outer surface of a sand grain, apparently by physically shouldering it out of the way and crowding themselves so tightly packed around the grain that oil is displaced.

2. They have the additional power to secrete a detergent-like substance which lowers the surface tension of the oil present around the sand to the point where it releases its grip and is freed for recovery through the open pore spaces.

3. They are responsible for the production of acids or acidic substances which attack limestone or limy materials and dissolve them, releasing any oil adhering to these materials, and at the same time forming carbon dioxide gas, which may further aid in recovering the released oil.

4. There are indications that they attack the heavier (and therefore more viscous hydrocarbons) and split them into lighter hydrocarbons (which are less viscous and flow more freely through reservoir pore spaces).

Concerning the Athabaska oil sands, previously mentioned because of their potential military strategic importance, the patent states categorically: "Athabaska oil sands from the Athabaska region of Canada have been found to release oil when subjected to contact with a medium of the bacteria. The bacteria attach themselves so tenaciously to solid surfaces that they cannot be flushed away by the ordinary flow of fluids in a formation."

No quantitative data on the experiments at Scripps Institute have been released to the public as yet. However, there is a second phase to the bacteria work, which has been carried on at Bradford, Pa., by the Pennsylvania Grade Crude Oil Association. This will be discussed in a subsequent article.

### Patent Sought

After Dr. ZoBell's work at Scripps Institute reached the stage where a patent was sought, the A.P.I. research committee looked for a place where commercial application research work could be carried on, supported by funds not confined to fundamental science. The patent had not yet been issued, and wartime secrecy regulations covered much of the work.

Ethical considerations also entered in. No private company could be permitted to gain individual competitive advantage by doing the work. The ultimate solution was to turn the problem over to the research division of the Penn Grade Crude Association, a nonprofit organization. The times required some peculiar arrangements, in that the members of the Penn Grade Association were contributing some of the funds for a project, the nature of which had to be withheld from all but a few of the directors of the association. Thanks to the confidence of the members in their directors, and the mutual trust among the directors and the A.P.I. research committee members, this caused no great difficulty.

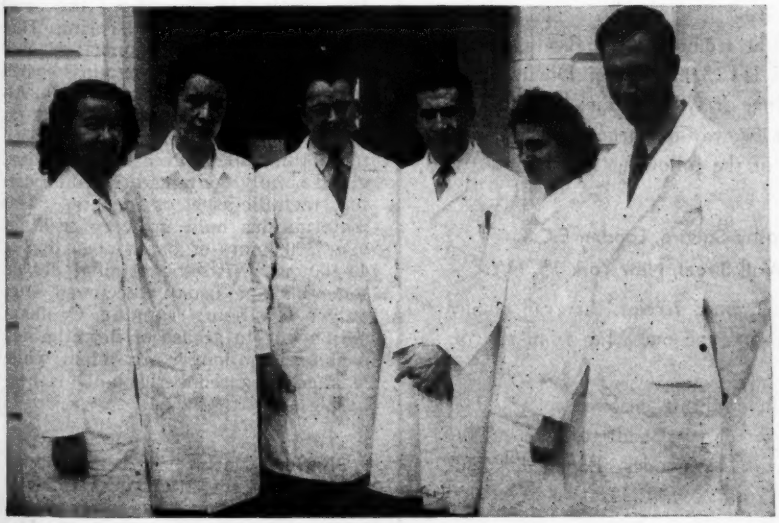
Dr. ZoBell visited Bradford in July 1944, and on his first visit, investigated the produced waters of the Pennsylvania Grade secondary-recovery fields in New York and Pennsylvania to ascertain two things. One, whether or not any of the type of sulfate-reducing bacteria he had discovered were already present in the produced waters, and two, whether or not his type of bacteria would grow in these waters.

Samples of the oil-field waters were taken to his California laboratory and checked. It was found that there was some evidence of the presence of a different kind of sulfate-reducing bacteria in some waters; and also that there was nothing in the Penn Grade waters to inhibit the growth of the bacteria he had been working with in California.

This took time, but when satisfactory results were reported, steps were taken to secure the services of a qualified microbiologist to work at Bradford. The first man obtained spent some time at Scripps Institute with Dr. ZoBell, then came to Bradford. However, after only a few months, this man decided to return to teaching work.

Due to the general manpower shortage, which was even greater in the case of qualified microbiologists, no replacement could be secured until January 1946. Then a second man, Dr. J. V. Beck, whose services had been previously sought without avail, was persuaded to leave University of Idaho and take on the work. Dr. Beck spent the month of February with Dr. ZoBell in California, and came to Bradford to pick up the work in March 1946.

A considerable amount of time had to be spent in preliminary testing of various aspects. In water-flood fields, the injected water is of considerably different chemical constitution from that of the connate water in the oil sands. As the flood advances, the relative proportions of flood water and connate water are constantly changing, and any given portion of the sand might be contaminated by flood water at any time. The questions to be answered were whether these various mixtures would affect



*Dr. ZoBell's staff at Scripps Institute: Helen Whelpley, Josephine B. Senn, Dr. C. E. ZoBell, Dr. William D. Rosenfeld, Jean E. Switzer, and William Hutton*

the ability of the ZoBell bacteria to thrive.

More positive evidence was sought to see if confirmation could be had of the indications first found that there might be native Bradford sulfate-reducing bacteria. Numerous cultures of native sulfate-reducing bacteria were found on the surface, around wells, tank batteries, in tanks, and flow lines in the field. Likewise numerous cultures of bacteria were found in the bottoms of the wells in the field.

But on the basis of the evidence to date, there is no proof that sulfate-reducing bacteria actually exist in the sand away from the well, or that there are any bacteria originally present in the sand. There is ample evidence that there is every opportunity for surface bacteria to be carried into the well bore and to continue to exist there. Dirt dropping into the well from the surface, or carried in on drilling or cleanout tools, or on tubing, or rods, easily can account for their presence at the bottom of the well. Whether those found there thrive on the environment, or are maintained only by constant replenishment from continued surface contamination, is difficult to determine.

The negative evidence, indicating there are no indigenous sulfate-reducing bacteria originally present in the sand, is that cores taken carefully, quickly flame sterilized on the outside, then sealed, show no bacteria when broken open and tested in the laboratory.


MINISTRY OF ECONOMICS
BAGHDAD

# TENDER FOR OIL REFINERY

(1) Tenders are invited by the Ministry of Economics, of the Government of Iraq, for the supply and erection of an Oil REFINERY at Baiji to supply the Iraqi market with the petroleum products as detailed in the "General Specifications" section of the Contract Documents.

The Refinery shall utilize crude oil from the Kirkuk oilfields which are being developed by Messrs the Iraq Petroleum Company. The annual throughput of the Refinery will be of the order of 600,000 tons.

(2) The Contract Documents may be inspected in due course at any of the following offices:

a) The Ministry of Economics, Baghdad.
b) The Royal Iraqi Embassy, 22 Queen's Gate, London, S.W.7.
c) The Royal Iraqi Embassy, Washington, D.C.
d) The Royal Iraqi Consulate General, 36 Riverside Drive, New York City.

(3) Firms desiring to tender will be required to produce a receipt for a cash deposit to the value of ID. 3,000 (Iraqi Dinars three thousand) or its equivalent in sterling or U.S. Dollars to be placed at the disposal of the Government by way of earnest money. The deposit should be placed with one of the following Banks:

a) The Rafidain Bank, Baghdad.
b) The Eastern Bank Ltd., 2/3 Crosby Square, London E.C.3.
c) The Irving Trust Company, 1 Wall Street, New York 15, N.Y.

On production of the abovementioned receipt, they can obtain three copies of the Contract Documents and one Map from any of the abovementioned places.

(4) Tenders must be submitted in duplicate enclosed in a sealed envelope and dispatched by registered post addressed to "The Director General of the Ministry of Economics, Baghdad," and will be received up to noon on the 26th Nov. 1947.

ACTING MINISTER OF ECONOMICS


# Improvement in Agitator Stuffing Box

*Continued from page 89)*

forded by a hard fiber gasket located between the bottom of the packing gland and the polymerizer nozzle opening. This gasket projected almost against the shaft shoulder, but as it later developed, it distorted and permitted packing to extrude past when the packing follower was tightened. This particular stuffing-box design is apparently used where corrosion is severe and only glass surfaces can be exposed. Although leakage out of the vessel could have been prevented by adaptation of some type of rotary seal or pressure-equalizing device in conjunction with the original stuffing box, the more important problem of contamination by the packing or lubricant still had to be solved. Design, fabrication, and installation of a suitable replacement for the stuffing box was not possible, owing to urgent demands for the equipment.

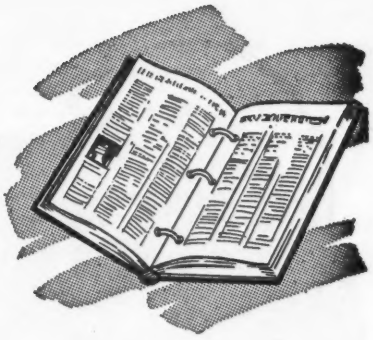
### Ring Made From Steel

The difficulty was completely eliminated by providing a special packing-support ring between the original packing gland and the reactor nozzle through which the stirrer entered. The new assembly is shown in the accompanying figure. This ring was fabricated from steel and was fitted with a bronze insert, permitting close clearance to the rotating shaft without the usual danger of grabbing or scoring. That portion of the new support exposed to reactor conditions was glass coated to make it inert to the reactants. Although the original stuffing box included a lantern ring and provision for adding oil or grease, the revised gland simply contains a self-lubricating metallic-asbestos packing. This material has held up very well for over 300 hours of batch operation at 40-100 psi. With the original design, some leakage usually occurred after only a few hours' running. Contamination due to grease or disentigrated packing is no longer a problem, while leakage of gaseous reactants is negligible.

**Charles Clark** has been elected president of the Michigan Geological Society. Other officers are **W. A. Kelly,** vice president; **H. J. Hardenberg,** secretary-treasurer; and **Jack Mortensen,** business manager.

# The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL



# Centrifugal-Pumping Curves

**TENTATIVE SCHEDULE OF TOPICS**

**No. 145—May 24, 1947—Pumping Costs**
**No. 146—May 31, 1947—Steam Consumption—1**
**No. 147—June 7, 1947—Reciprocating Pump Calculations—2**
**No. 148—June 14, 1947—Steam Consumption—2**
**No. 149—June 21, 1947—Centrifugal-Pump Curves**
**No. 150—June 28, 1947—Impeller Size and Pump Speed**
**No. 151—July 5, 1947—Fittings for Pumps**
**No. 152—July 12, 1947—Expansion of Liquids**
**No. 153—July 19, 1947—Power Formulas**

THE performance of centrifugal pumps is described by so-called "characteristic" curves. These describe the corresponding values of head (pressure), power, and efficiency at each different capacity of the pump. Fig. 1 shows these relations for one single-stage centrifugal pump operating at 1,450 r.p.m. At very low capacities (or at closed discharge) the head or pressure is high (168 ft.) but the efficiency is low (or zero) and some power is required (42 kw.) in churning the liquid in the case. As the discharge valve is opened, more and more of the power in the revolving impeller is utilized in batting or throwing the liquid against and into the discharge pipe. In the middle range of capacity, a well-designed pump operates at an almost constant efficiency (400-800 g.p.m.). Finally at higher ranges of capacity (or at wide-open or unimpeded discharge) the fluid leaks back past the impeller blades toward the discharge connection to such an extent that the efficiency again drops to zero and the head rapidly drops to zero.

**Head.**—The energy content of a moving material is purely a function of its velocity and hence the head produced by a centrifugal pump is not affected by the weight or density of the liquid being pumped. The pressure, however, is affected by density as follows:

$$\text{Psi.} = 0.433 \text{ ft.} \times \text{sp. gr.}$$

$$\text{Ft. head} = \frac{2.31 \text{ psi.}}{\text{specific gravity}}$$

**Power.**—The power imparted to the fluid by a centrifugal pump in terms of several convenient units is:

$$\text{Horsepower} = \frac{wh}{33{,}000} = \frac{\Delta P_L G}{1{,}713} = \frac{Ghd}{3{,}957}$$

in which:

W = liquid liquid, lb. per minute
h = head, ft. of fluid
G = gal. per minute
$P_L$ = discharge pressure minus suction pressure, psi.
d = specific gravity

The power required by the pump is larger than the above because of the inefficiency of the pump. The above formula should be divided by the pump efficiency ($E_p$).

Finally, the power input to the drive mechanism is even larger because of the efficiency of the driver ($E_d$).

Thus:

$$\text{Kilowatts} = \frac{Ghd}{0.5306 E_p E_d} = \frac{\Delta P_L G}{0.2297 E_p E_d}$$

The efficiency of electrical motor is often close to 90 per cent.

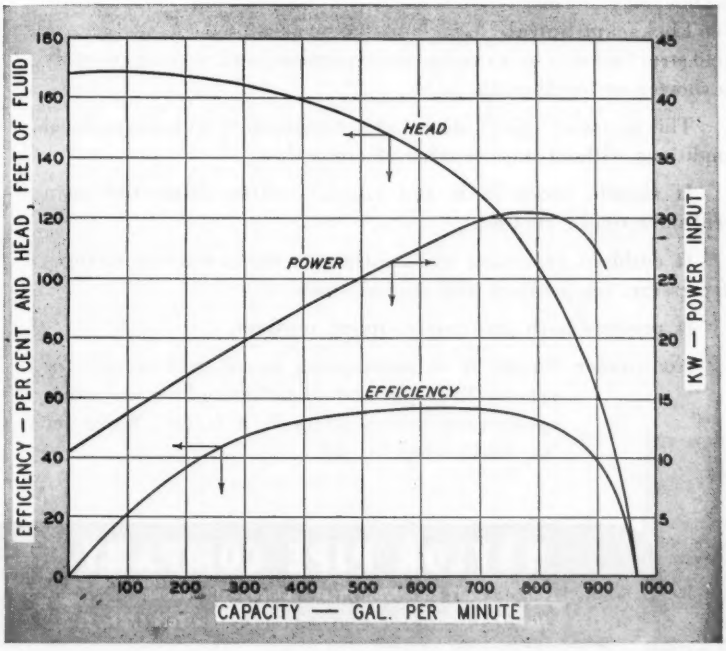



*Fig. 1—Characteristic performance curves of centrifugal pumps*

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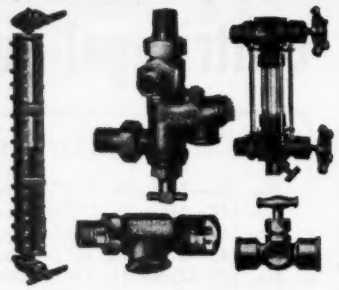

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# MODERN Rotary DRILLING

## Developments in Electric Power

THE capacity of an electric, direct-current, rig may be increased by the compounding of two or more generators, usually in parallel.

Fig. 29 shows the speed-torque characteristics of a motor operating from four generators compounded in parallel. It should be noted that the maximum torque of the motor is nearly directly proportional to the number of parallel generators, while the maximum speed of the motor is constant regardless of the number of generators operating in parallel.

### Electro-hydraulic Governor

The newest development in the field of electrical transmission of power in a rotary rig is the electro-hydraulic engine governor.

In a conventional diesel-electric rig the engine runs continuously at or near its rated speed, all the speed and torque regulation occurring within the electrical system.

The functions of the governor and the manner in which they are accomplished are summarized below.

**Speed adjustment.**—An electric tachometer produces a signal directly proportional to the speed of the engine. This signal is put into a solenoid-operated valve, the pull of the solenoid being balanced against a spring. Change in the engine speed, producing change in the electric signal, causes the valve to open, until balance between the spring and the solenoid is restored. The opening of the valve admits oil, under pressure, to one or the other side of a piston, which actuates the throttle of the engine. Thus, if there is any change in the preselected speed of the engine, the piston automatically moves the throttle to readjust the speed. The adjustment is up to the full-throttle opening, where the throttle is resting against a stop. The position of the throttle stop may be adjusted automatically as a function of the engine speed. This portion of the operation of the governor is represented by segment W-X of the volt-ampere characteristic curve shown in Fig. 30.

**Overload protection.** — If, with the throttle wide open, additional load is imposed on the generator, the engine slows down momentarily, causing the valve to open. Further movement of the piston does not have any effect on the throttle, which is positioned against the stop. However, it does put into operation a rheostat, which reduces the generator field, i.e., the load, thus maintaining the engine speed. This constant generator output is represented by segment X-Y of the curve in Fig. 30. The current limitation, shown in segment Y-Z of the curve, is automatic and is accomplished by means other than the governor.

The governor limits the generator load to the ability of the engine. If, for instance, with the engine running at full speed and the throttle wide open, one of the engine cylinders should cut out, the engine would slow down momentarily, the piston would back off on the generator field, and the constant generator output would be held along the line X'-Y' of Fig. 30.

**Engine-speed control.** — A rheostat is interposed between the electric tachometer and the solenoid valve. This rheostat is operated by the driller. The more resistance that is cut in, the faster the engine has to run to establish balance between the solenoid and the spring. Thus, any speed may be selected within the operating range of the engine, from half to full speed. As the speed is changed the whole voltage characteristic moves up and down (Fig. 30).

**Operation.**—As far as the driller is concerned, operation of the handwheel simply starts the motor and regulates the motor's speed. Actually with the engine idling at half speed and the generator having zero field, moving the control from the "off" position causes the field to be applied gradually to the generator with the engine remaining at half speed. Just before the full generator field is achieved, the engine begins to speed up. Further movement of the control increases the speed of the engine. The governor takes over the function of maintaining the selected engine speed and regulating the generator load.

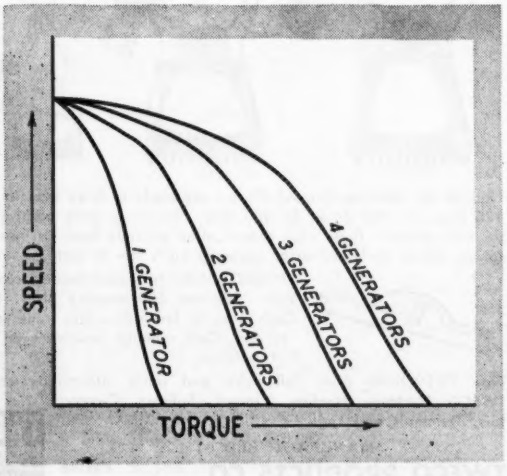



*Fig. 29 — Speed-torque characteristics of a motor with four generators in parallel*

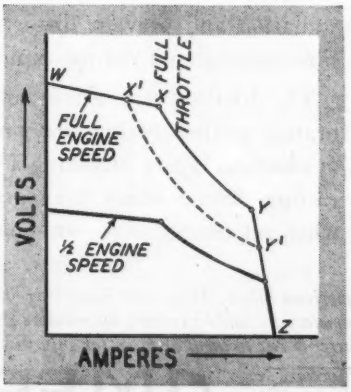
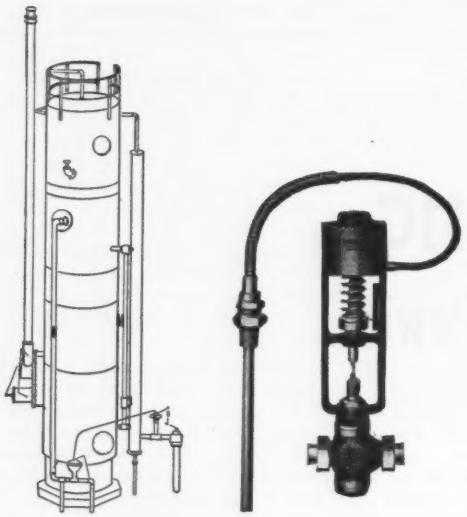



*Fig. 30—Characteristics of a generator operating with an electro-hydraulic governor*

**No. 25 in a series by Joseph Zaba, petroleum engineer, Houston**



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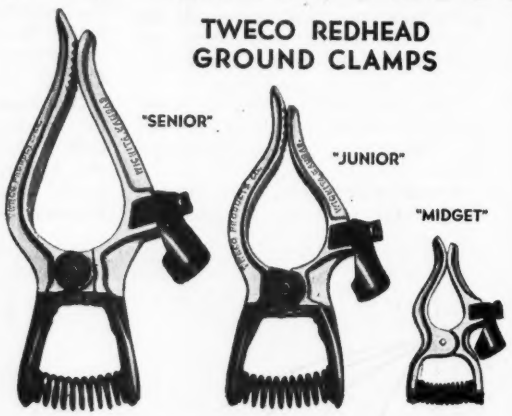


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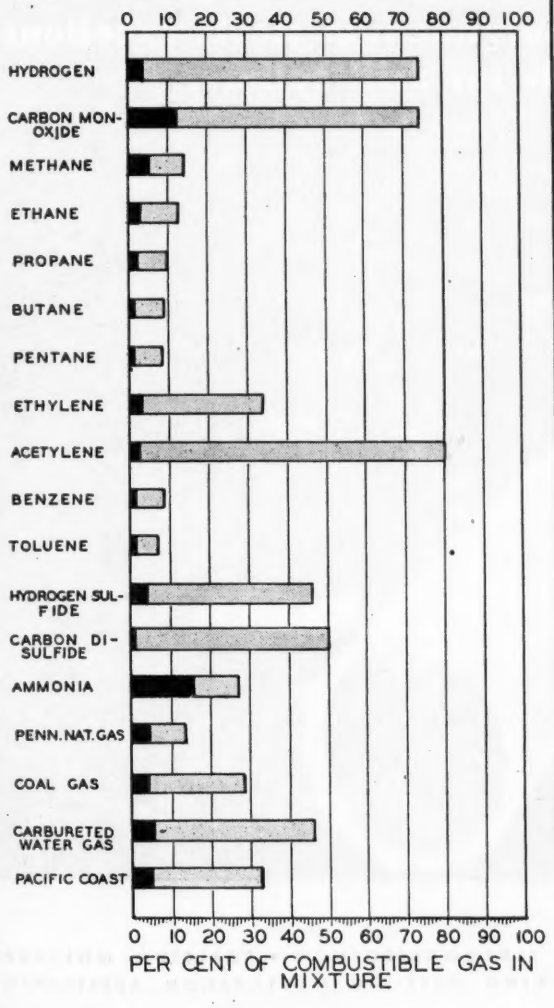
# ENGINEERING fundamentals

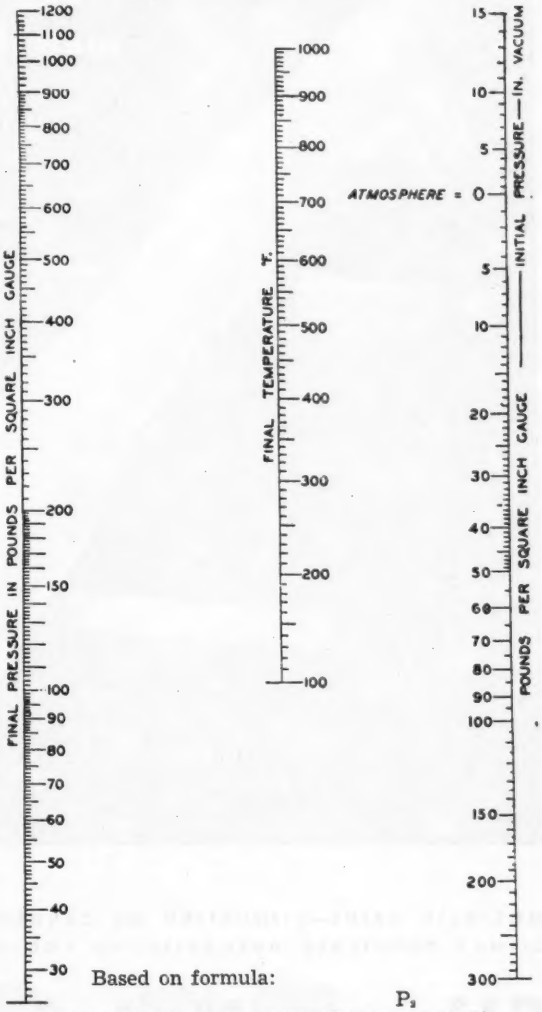
This is the fifth of a series of useful graphs, alignment charts, and fluid-flow curves presented through the courtesy of the Southern California Meter Association.

## Combustible Limits of Gases




The above chart shows graphically the combustible limits of gases when mixed in various proportions with air. The shaded portion in each case represents the combustible limit. Thus methane, for example, is explosive when mixed with air in proportions of 5.3 to 14 per cent methane. The inflammability limits are somewhat under their explosive limits but are of greater importance inasmuch as they show the point at which danger begins. (Data on this chart are obtainable from the Bureau of Mines Bulletin No. 297.)

## Temperature Rise of Gas During Compression



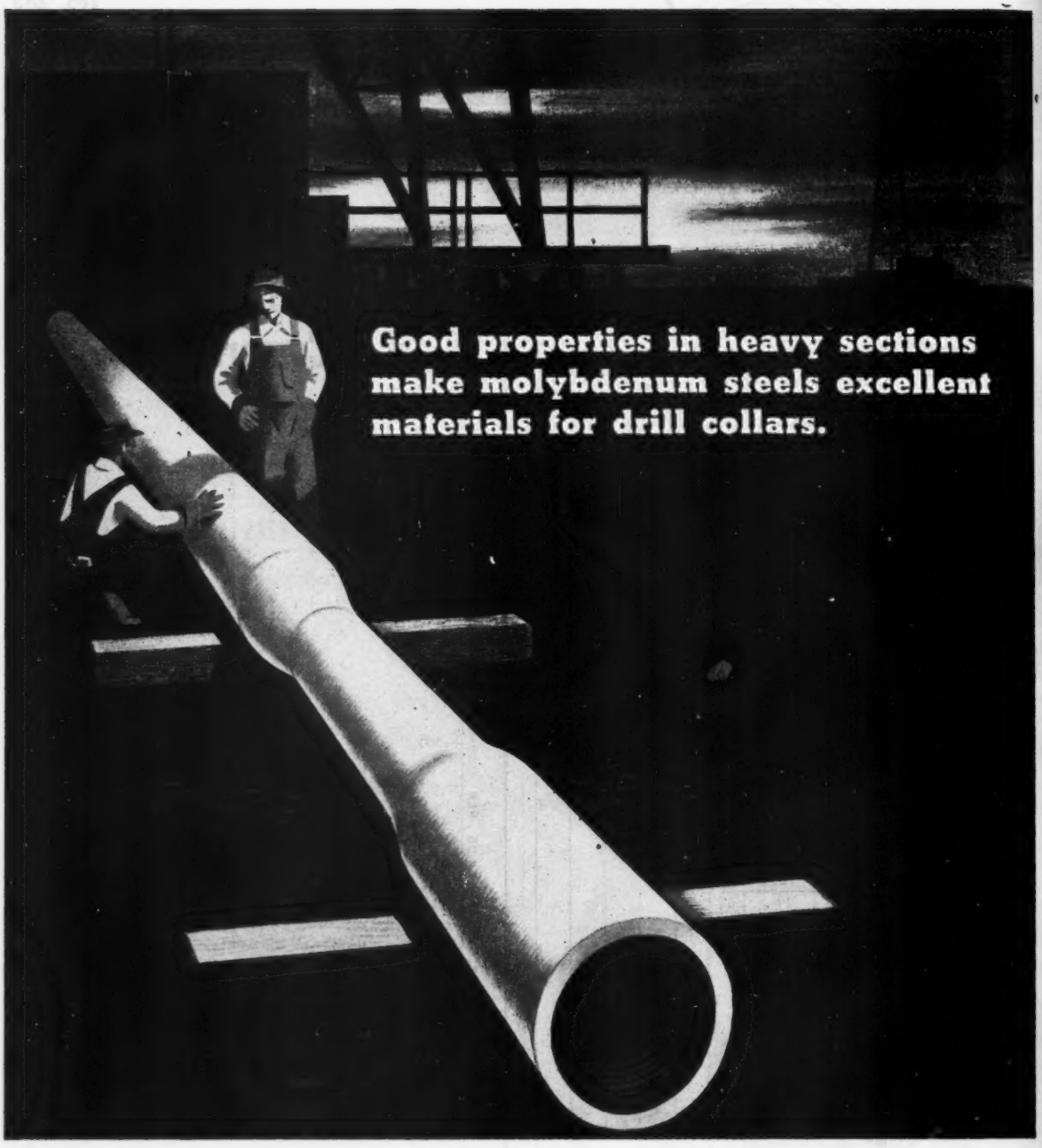

Based on formula:

$$(T_2 + 460^\circ\text{ F.}) = (T_1 + 460^\circ\text{ F.}) \left(\frac{P_2}{P_1}\right)^{(n-1)/n}$$

where

$T_1$ = temperature of gas, °F.
$T_2$ = final temperature.
$P_1$ = initial pressure, psia.
$P_2$ = final pressure, psia.
$n$ = exponent of compression.

Assumptions: $T_1 = 80^\circ$ F.
$n = 1.26$

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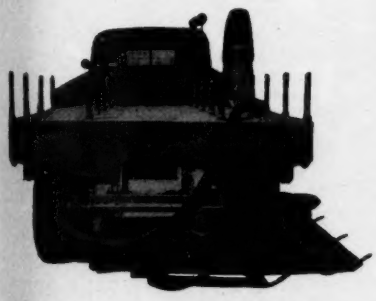
# OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

*by John M. Spears*

**(1) FLAT-TOP TANK TRUCK** is designed to do all-purpose hauling. Its engineered tank is built with a flat top, for use as a platform truck. Tank is available in 550, 650, or 800-gal. capacity, yet is proportioned so that the platform of the truck is only 8 in. higher than the platform of an ordinary flat-bed truck. Heavy cross members that support the flat-top platform are inside the tank, and serve as baffle plates. Tank is easily loaded with a vacuum loading device, operated from the truck motor. Removable stake pockets make it easy to partition truck when hauling drill or other pipe. *Winter-Weiss Co.*



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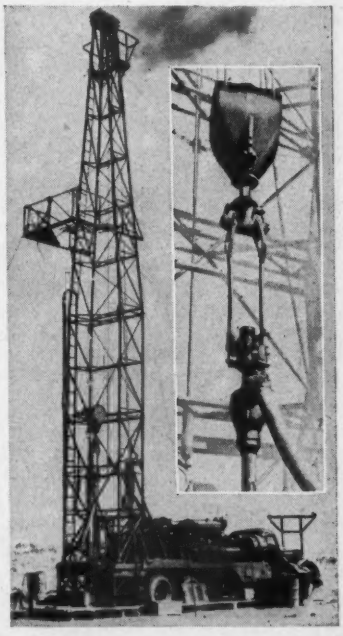
**(2) TUBELESS TIRE** combines the safety features of puncture-sealing inner tubes with improved riding qualities, high bruise resistance, and remarkable ability to retain air pressure. The tubeless tire embodies rayon-cord construction. The tire is now in the process of undergoing all known tire tests. *B. F. Goodrich Co.*

IT'S NEW ✓ CHECK IT

**(3) NEW HOLEMASTER DRILL** is designed for core drilling, deep exploration holes, electric logging, water wells, mineral exploration, and slim-hole production to a depth of 4,000 ft. Balanced crown block insures more even loading of the mast legs. Mast is sectional and additional length may be added. Lightweight, all-steel, oil-bath rotary table is easily removed and adapted to special drive and table stand for rathole drilling. New type double draw works is actuated by two air clutches. Heavy-duty transmission provides four rotating speeds and one reverse. Dual engines are coupled through a special hydraulic cushion drive which makes possible any drive application from individual to compounding of engines to drill and pump. Better portability for drill is provided by a new block, hook, and swivel combination permitting use of a shorter mast. Block has builtin spring hook with 6-in. stroke, full ball-bearing swivel, and swivel lock. Smooth lines and absence of sharp corners of the combination eliminate any tendency to catch in the mast bracing. Lightweight water swivel features a simplified packing arrangement with only two parts, including the packing ring, subjected to wear from abrasive slush. Packing is located below bearings and in event leakage occurs slush cannot enter bearing chamber. *Geo. E. Failing Supply Co.*



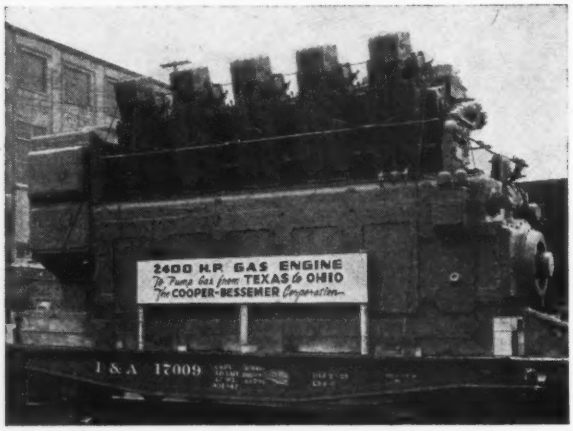
IT'S NEW ✓ CHECK IT

**(4) GIANT ANGLE COMPRESSOR** reduces installation, piping, foundation, and other building and servicing

**The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.**

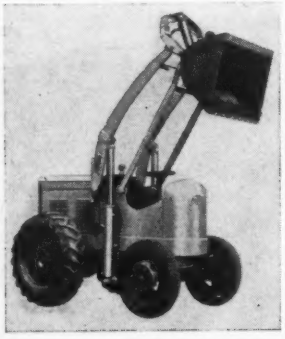
**Keep Informed. Save Time. Tear Out Card. Check It. Mail It.**

costs. Unit is a two-cycle V-type engine available in 6, 8, and 10-cylinder (illustrated) sizes. With an 18-in. bore and 20-in. stroke it is rated 240 hp. per cyclinder at a speed of 250 r.p.m. Unit will perform equally well




as a gas or diesel-power engine or as a gas-engine-driven compressor. Since the compressor crosshead beds are not necessary to the scavenging system, they are removed from a unit used for power application, thus increasing space-saving possibilities. *Cooper-Bessemer Corp.*

IT'S NEW CHECK IT



**(5) NEW PAYLOADER** has innovations and features which contribute to higher production and greater economy. A unique four-speed fully reversible transmission provides practical forward digging speeds plus high reverse maneuvering speeds all quickly available with a minimum of shifting. A single lever shifts gears into the desired speed range—thereafter the operator controls forward or reverse by merely flipping a directional lever. The bucket is raised, lowered, dumped, and relatched by hydraulic power, controlled by a single lever. Bucket may be dumped completely or gradually at any height. Full bucket capacity is assured and spillage of loose materials prevented by means of the automatic bucket tip-back. Equipped with hydraulic brakes. *Frank G. Hough Co.*

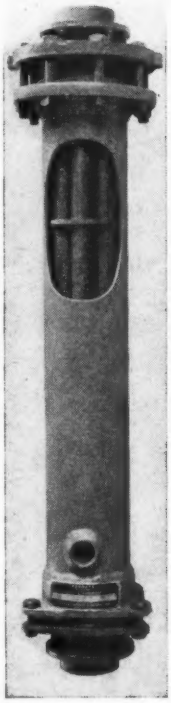
IT'S NEW CHECK IT

**(6) HARDALLOY** is a new direct-current, reverse-polarity arc-welding electrode that provides weld metal which is highly resistant to impact or abrasive wear in hard-surfacing applications. Weld metal as deposited tests 59.0 Rockwell "C" hardness and is capable of being heat treated for machining or grinding, and subsequently reheat treated to restore it to its as-deposited hardness. Low-hydrogen electrode coating minimizes underbead cracking on hardenable steels. *McKay Co.*

IT'S NEW CHECK IT

**(7) FOX DIAMOND DERRICK** is easy and safe to erect and dismantle and provides safe load capacities and stresses. Construction conforms to A.P.I. specifications throughout. First horizontal girt extends on three sides of the derrick but does not extend across the fourth side; namely, the "V" or window-opening side. Second girt is placed 7 ft. above the first on all sides, except across the "V." All subsequent horizontal girts are applied uniformly at the usual 7-ft. intervals on all four sides. Manner of placing diagonal braces reduces the unsupported length of the leg members as well as providing girt supports. Principle of staggering the legs is employed in erecting the derrick. Derricks are available in all heights in silicon or mild steel. *Tierney Co.*

IT'S NEW CHECK IT

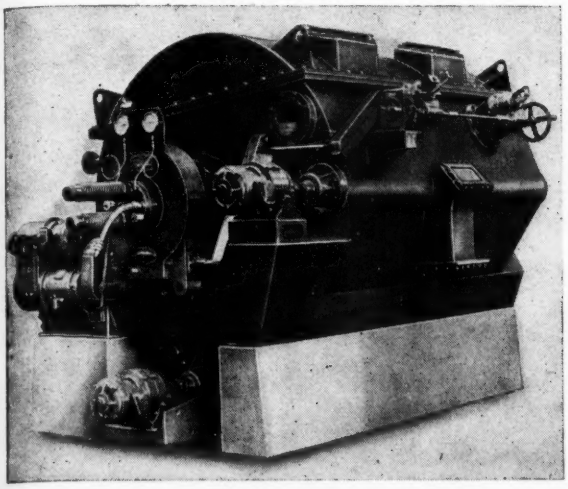


**(8) SEVEN-TUBE HEAT EXCHANGER** for use under highly corrosive conditions, is available in three standard sizes of 4 ft. 3-in., 7 ft. 3-in., and 10 ft. 3-in. lengths. All three units employ 1-in. i.d. by 1½-in. o.d. "Karbate" tubes in bundles encased in standard 6-in. i.d. steel pipe shells. Units can be employed as heaters, coolers, boilers, or condensers, and can be operated vertically or horizontally. They will carry temperatures up to 338° F. (170° C.) and a working pressure of 50 psi. on both the tube and shell sides. Standard nozzle connections permit ready installation with piping connections of almost any material of construction. Water, brine, or steam are suitable on the shell side. Unique feature of construction is the combination of tube sheet, dome, and nozzle into one monolithic piece, which eliminates packed joints for the corrosive liquid and reduces the number of gasketed joints on the fluid side to one gasket at each nozzle. *National Carbon Co., Inc.*

IT'S NEW CHECK IT

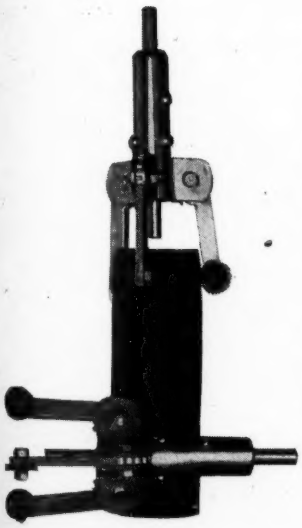
**(9) CONTINUOUS PRECOAT FILTER** reclaims refinery slop oils and delivers a filtrate which readily separates into water and oil phases—the oil being suitable for rerun. Precoat method consists of forming a thick "pre-

coat" of cake of diatomaceous earth on the surface of a rotating filter drum. Solution to be filtered is charged continuously, the solids forming a thin film on the sur-



face of the precoat. A traveling knife edge shaves off this film plus a thin layer of the precoat. Thus a fresh filtering surface is provided at all times for cake deposition. Filtering cycle usually lasts several days; precoating takes only an hour or two. In the case of slop oils, precoat filtration removes solids which stabilize the emulsions, thereby providing a clean separation of oil and water. *Oliver United Filters, Inc.*

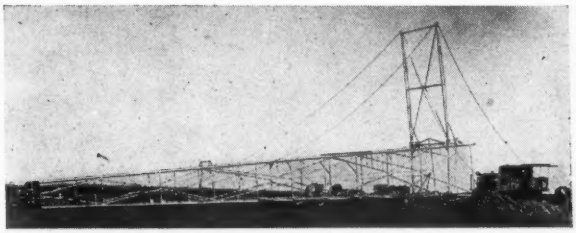
IT'S NEW CHECK IT



**(10) ROTARY THREAD CLEANER** provides easy and fast way of cleaning pipe threads. It can be used with an electric or hand drill. Can be run in and out of an internal thread or on and off an external thread without stopping the tool. Chasers are free to rotate and the "lead" of the thread has no effect on the tool. Can be used on any pipe from 2 to 8-in. Chaser arms are expanded or retracted simply by screwing the knurled adjusting screw in or out. Tool is self-aligning—does not cross threads even though held at an angle. *Williams Tool Co.*

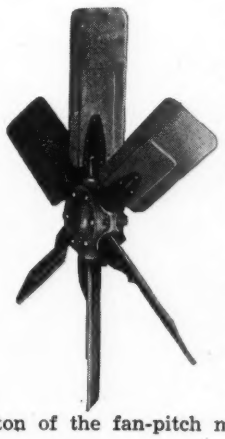
IT'S NEW CHECK IT

**(11) PORTABLE DERRICK** is made of seamless steel tubing, in three sections for easy loading on trailers for long transfers. The four main derrick legs, as well as supporting cross-braces, are joined as sections. Steel bolts are used throughout with a bullet-nosed dowel pin incorporated in each flange to give strength and rigidity. Sectional members are jointed by flanges which bolt securely together. Front derrick legs are hinged to a tubular cross member which serves as a pivot when raising or lowering the derrick. Swivel fingers on the pipe rack enable locking of the first row of drill pipe



to protect against excessive wind loads. Pipe rack has a vertical adjustment to accommodate drill-pipe stands of from 87 to 96 ft. Another feature is the removable derrick ladder. Foregoing construction features make it possible to assemble derrick on the ground in horizontal position. Crown and traveling blocks are strung completely for drilling and the entire assembly is raised by the draw works. *Oil Well Supply Co.*

IT'S NEW CHECK IT



**(12) THERMO - CONTROL FAN** provides variable pitch for automatic precision temperature control of coolants in internal-combustion engines used in the oil fields where extreme differences in temperature are found. Fan changes pitch as engine and ambient temperatures tend to vary, maintaining correct operating temperature of the engine. Feature of fan is a direct-temperature-actuated thermal power element, which utilizes expansion of special materials sensitive to temperature variations. Pressure developed by expansion of these materials is transmitted directly to a stainless-steel actuating piston of the fan-pitch mechanism. *Evans Products Co.*

IT'S NEW CHECK IT

## TRADE LITERATURE

**(13) ROPE AT WORK.** New 32-page booklet describes "How to Put Rope to Work in Industry." Features helping your workers make longer, safer use of their rope at lower cost. *Plymouth Cordage Co.*

IT'S NEW CHECK IT

**(14) TWIN-ENGINE AIRPLANE.** Colorful brochure describes latest version of manufacturer's twin-engine plane. Stresses time and distance factors, comfort and relaxation, and pilot convenience. Color charts give per-

formance, and range data. Standard equipment and seating arrangements also included. *Beech Aircraft Corp.*

IT'S NEW CHECK IT

**(15) COLOR CONDITIONING,** dealing solely with the application of color as a functional force, is specifically designed to promote efficiency, increase production, improve quality, reduce personal injuries, and improve employe-management relations. Principles of color conditioning, based on years of research, is explained in this new four-color booklet. *E. I. du Pont de Nemours & Co.*

IT'S NEW CHECK IT

**(16) OIL-FIELD PARTS.** A three-color bulletin describes and illustrates liners, piston rods, sprockets, wash pipes, sheaves, and gears and pinions, made by "Tool Steel" process. Explains how parts are hardened to meet the most severe oil-field requirements. *Tool Steel Gear & Pinion Co.*

IT'S NEW CHECK IT

**(17) ALLEGHENY METAL.** New four-color brochure contains story of stainless steel in the production and processing of oil. Material is a study of high potential value and interest to management and technologists of the industry and fabricators of their equipment. Stainless steel is described in the crude oil field, oil refining industry, cycling and natural gas, oil transportation and storage, and marketing. Also contains corrosion-resistance chart and other interesting information. *Allegheny Ludlum Steel Corp.*

IT'S NEW CHECK IT

**(18) L.P.G. DISTRIBUTOR KIT.** L.P.G. promotion material will be of interest to dealers. Kit has sales, merchandising, and advertising aids. Contains newspaper ads, newspaper story, radio announcements, and consumer folders. *Warren Petroleum Corp.*

IT'S NEW CHECK IT

**(19) OIL AND GAS SEPARATORS.** Beautifully bound 137-page catalog covers complete line of manufacturer's separators used by the petroleum industry. Five sections treat the following topics: Features and discussion of method of separation; catalog drawings, specifications and installation dimensions; control equipment and accessories; separator capacities, oil-valve capacities, and gas-valve capacities; Vocotraps, general description, specifications, installation dimensions and capacities. Illustrated. *Parkersburg Rig & Reel Co.*

IT'S NEW CHECK IT

**(20) GRAPHICAL VAPOR PRESSURE.** New nine-page bulletin describes and illustrates a vapor-pressure recorder for continuously and automatically measuring and recording true vapor pressure of liquid streams being processed. Material includes the importance of vapor pressure, operation and maintenance of the recorder, its accuracy and the cost of operation. *Industrial Engineers, Inc.*

IT'S NEW CHECK IT

**(21) SCREW PUMPS** for high-viscosity petroleum products such as crudes, Bunker C, greases, and paraffins are treated in 18-page, 2-color catalog. Specifications, charts, graphs, and dimensional drawings are included. *Sier-Bath Gear & Pump Co., Inc.*

IT'S NEW CHECK IT

**(22) PYREX GLASS PIPE.** New two-color bulletin describes and illustrates glass pipe which solves corrosion problems and maintains product purity. Contents cover 30 subjects such as accessories, cleaning, joints, installation, pipe hangers, sizes, temperatures—operating, etc. *Corning Glass Works.*

IT'S NEW CHECK IT

**(23) PUMPS, ACCESSORIES, AND WELL-SERVICING TOOLS.** New loose-leaf bound 82-page catalog covers complete line of manufacturer's pumps and well-servicing equipment. Index lists some 46 products. Specifications and illustrations accompany each item. Price list included. *Walter O'Bannon Companies.*

IT'S NEW CHECK IT

**(24) SYNTHETIC AMMONIA PLANTS.** A 14-page bulletin includes comprehensive flow charts showing synthetic ammonia production from a variety of hydrogen sources—coke, hydrocarbon gases, or electrolysis of water. The process, by which nitrogen and hydrogen are made to combine under compression and in the presence of a catalyst, is fully described. Outlines of each phase of production, including gas purification, is included. Numerous photographs provide a visual tour of a typical ammonia plant. *Chemical Construction Corp.*

IT'S NEW CHECK IT

**(25) THERMOSWITCH CONTROLS.** Attractive two-color loose-leaf catalog presents facts necessary for the proper application of thermostats to heat-control problems. Includes art of thermostatics—a method of analyzing and coordinating process requirements, heating means, control devices, and product design to insure best over-all performance of the complete thermal-control system. Fifty-two illustrated pages. *Fenwal, Inc.*

IT'S NEW CHECK IT

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**Keep Informed. Save Time. Tear Out Card. Check It. Mail It.**

# Prevent

## PARAFFIN ACCUMULATION IN YOUR PUMPING WELLS

Here is the solution to that serious and costly problem of production . . . paraffin accumulation in your pumping wells. With Huber Scrapers attached to the sucker rods, the rod string itself becomes the paraffin scraper. The rod string, with Scrapers attached, is rotated a fraction of a turn on each reciprocation by means of the rotating head rod hanger. The Scrapers, clearing the tubing wall by only a fraction of an inch, scrape the accumulating paraffin from the tubing wall on each stroke of the pump.

Operation of the Huber Scrapers is automatic and entirely mechanical. They require no service or attention after installation . . . they eliminate the frequent and costly job of steaming out or "passing rods" to keep the well on production.

If you are having paraffin trouble in your pumping wells you need Huber Scrapers. Write for full information and detailed records on the savings other operators are making with Huber Scrapers.

UBER

### PARAFFIN SCRAPER

These scrapers are steel blades, securely attached to the sucker rod. A pre-formed clip, welded to the scraper, is "shrink-welded", under pressure, around the rod. Six scrapers are spaced two feet apart on each rod. Scrapers for 2" tubing are 1/8" thick, 1 1/2" wide, 2' long. Proportionally larger scrapers are used for larger tubing.



### ROTATING HEAD

The rotating rod hanger is attached to the unit's or jack's head by a conventional wire line bridle. The polish rod is clamped in the hanger by case-hardened slips and jamnut riding on top of a heavy duty horizontal thrust bearing.

A turntable is firmly attached to the polish rod below the rotating hanger. Two ratchet levers, engaging teeth on the turntable, and operated by a flexible steel cable extending from the walking beam, rotate the rod string a fraction of a turn on each stroke.

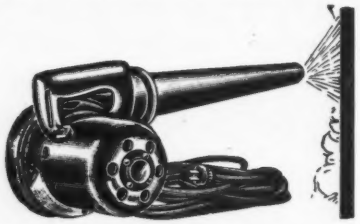
HUBER

**ORDER FROM YOUR SUPPLY STORE**

# J. M. HUBER CORPORATION

**POST OFFICE BOX 831** **BORGER, TEXAS**

## BLOW DUST AWAY WITH POWERFUL MARTINDALE BLOWERS



These powerful blowers have many uses—on motors, in stock bins, etc.

Suction attachments are available to change them into vacuum cleaners in a few moments.

All motors are Norma Precision Ball Bearing, require no oiling, have 20 ft. of reinforced cord complete with rubber plug, and 11" semi-hard rubber nozzle.

### MILL-TYPE BLOWER

Discharges over 75 cu. ft. of air per minute. Has full 1 H.P. General Electric Universal Motor; 110, 220 or 250 volt.

Price ..... $102.25
Price complete with Suction Attachments ..... 115.55

### SUPER-BLOWER

Discharges over 60 cu. ft. of air per minute. Has 3/5 H.P. General Electric Universal motor; 110, 220 or 250 volt.

Price ..... $78.65
Price complete with Suction Attachments ..... 91.95

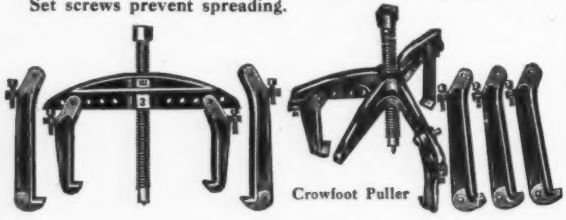
### BLOW-ER CLEAN

Discharges over 50 cu. ft. of air per minute. Has ½ H.P. General Electric Universal motor; 110, 220 or 250 volt.

Price ..... $59.90
Price complete with Suction Attachments ..... 73.20

## Martindale Wheel and Gear Pullers

Adjustable arms pull straight without squeezing the work. Set screws prevent spreading.



Crowfoot Puller

PRICES—NET, F. O. B. CLEVELAND, O.

| | Shipping Weight | |
|---|---|---|
| No. 0 Two-Arm Puller | 5 lbs. | $ 8.00 |
| No. 0 Crowfoot Puller | 8 lbs. | 10.20 |
| Both equipped with 3" and 6" arms. For diameters up to 6", reach 6". | | |
| No. 2 Two-Arm Puller | 24 lbs. | 17.50 |
| No. 2 Crowfoot Puller | 37 lbs. | 23.20 |
| Both equipped with 6" and 10" arms. For diameters up to 12", reach 17". | | |
| No. 3 Two-Arm Puller | 38 lbs. | 25.80 |
| No. 3 Crowfoot Puller | 65 lbs. | 34.00 |
| Both equipped with 7" and 11" arms. For diameters up to 18", reach 19". | | |
| No. 4 Two-Arm Puller | 65 lbs. | 36.30 |
| No. 4 Three-Arm Puller | 108 lbs. | 55.00 |
| Both equipped with 8" and 13" arms. For diameters up to 24", reach 22". | | |

***Send for a copy of New Catalog No. 26***

# MARTINDALE ELECTRIC CO.

**1398 HIRD AVE. • CLEVELAND 7, OHIO**



## STANDARD OF THE OIL FIELDS

# Gotkool

## WATER CANS & COOLERS

GOTKOOL WATER CAN
Made in 1½, 2, 3, 5, 10, 15 and 20 gallon sizes. (Push Button Faucet at slight additional cost)

GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. Gott Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today.

GOTKOOL WATER COOLER
Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes with Push-Button Faucet

## H. P. GOTT MFG. CO.

WINFIELD, KANSAS

KEEP PURE DRINKING WATER ALWAYS HANDY

## INSIST ON THE GENUINE

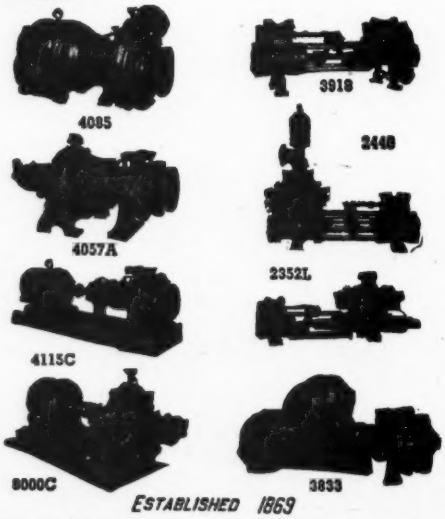
**Look for the Blue and Black Label with the name GOTKOOL in Red**



# PUMPS

**CENTRIFUGAL**
**RECIPROCATING**

**BUILDERS OF OUTSTANDING PUMPS**
**Since 1869**




*ESTABLISHED 1869*

## DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W TENTH ST.

# NATURAL GAS

## Natural-Gas Service in St. Paul Authorized

WASHINGTON.—The Federal Power Commission has authorized Northern Natural Gas Co. to construct facilities and sell natural gas to Northern States Power Co. for resale in St. Paul, South St. Paul, West St. Paul, and Rosetown, Minn. This service will begin upon completion of facilities previously authorized which will increase Northern Natural's system capacity to 407,000,000 cu. ft. a day.

St. Paul and environs are presently served with a mixture of natural and manufactured gas by Northern States Power, which purchases the entire supply of coke-oven gas manufactured by Koppers Co., Inc. For several years Koppers has been unable to produce enough coke-oven gas to meet Northern States Power requirements, and Northern Natural has been delivering about 2,000,000 cu. ft. of natural gas per day.

In 1945 the City Council of St. Paul adopted an ordinance authorizing a change over to delivery of straight natural gas. The ordinance was submitted to a people's referendum and approved a year ago. Such change over will require about 4,000,000 cu. ft. a day in addition to the amount presently received.

Although previously authorized to increase its system capacity to 407,000,000 cu. ft. a day, the company expects to realize completion of only 390,000,000 cu. ft. of capacity for the winter of 1947-48. This will do little more than take care of present customers. The FPC's authorization was granted upon the express condition that the facilities authorized for the St. Paul area shall not be used to increase the supply of natural gas to Northern States Power for use in St. Paul, South St. Paul, West St. Paul, and Rosetown until all of the 407,000,000 cu. ft. capacity has been constructed and placed in operation.

Facilities to be constructed under the newly authorized certificate include measuring stations and meter runs. Cost has been estimated at $48,331.

### Another Company Proposal

FPC last week also postponed until October 13 a hearing on Northern Natural's proposal to build facilities to increase system capacity to 580,000,000 cu. ft. daily. The company was ordered to file a supplement containing additional information on the project. Koppers is intervening in this case.

Facilities proposed in this application include a new compressor station of 10,000 hp. near Garden City, Kans., and 320 miles of 26 in. from the station to Palmyra, Neb.; 245 miles of 24 in. from Palmyra to Farmington, Minn.; 17.3 miles of 20-in. from Palmyra to a point in Saunders County, Nebraska; an aggregate of 8,200 hp. in existing compressor stations; a dehydration plant; and other equipment. Cost is estimated at $24,500,000.

## Louisiana Gas Proration Proposals Advanced

An advisory committee of the state conservation department met in New Orleans recently to study the proposal of instituting state-wide proration of natural gas in Louisiana. Rules will be written soon for six gas fields to establish the individual operator's share of gas produced in these areas, according to Paul Montgomery, executive assistant to Joseph L. McHugh, conservation chief. Fields affected are: Bayou Mallet, North and South Elton, Welsh, Jeanerette, and Roanoke.

Montgomery's proposal provided for division of the market demand for gas between operations in a field, and between fields, on the basis of the ratio of proved reserves of each well to total proved reserves of wells connected throughout the entire pipeline system.

R. H. Parro, district conservation commission manager, proposed gas proration on the basis of producing depth of the well, which is the basis now used for determining allowables for oil wells in the state. Under such a setup, each gas well would have a monthly allowable rate. Parro said that where an injustice existed to a producer or landowner in a field, a special order could be written for that field.

Attorneys for gas-producing and pipe-line companies, serving on the advisory committee, were not inclined to accept either of the two plans submitted. Grady Durham, conservation department attorney, held that neither plan would be workable, pointing to the disparity between gas prices at various fields and the fact many gas fields are not connected. Copies of the two plans will be submitted to technical officials of gas companies and others involved, for criticisms and suggestions, to be used as a guide toward arriving at a working plan.

# Natural Gasoline

## Corrosion Committee Reviews Developments

THE corrosion committee, Natural Gasoline Association of America, meeting recently in Dallas for its second quarterly session, reviewed technical developments of the past 3 months in its study of corrosion occurring in high-pressure gas-condensate wells.

Results of recent studies have confirmed the committee's conclusions that inhibitors properly employed are effective in the field, but that protective coatings or films are ineffective in well-head connections and of questionable effect in tubing strings, as presently applied. Coating improvements are being closely watched, with the possibility that they may prove successful in protecting both surface and subsurface equipment.

Concerning alloys, the investigation has revealed no definite conclusions to date. The relatively high cost of alloys in casing, tubing, and other equipment links the technical study of their use directly with economics. A subcommittee was set up under the chairmanship of W. F. Stewart, Sun Oil Co., Beaumont, to devote particular attention to the economic possibilities of alloy use.

Progress during the past year has brought a change in the program of the committee. Practical field studies were so well handled and supplemented by reports from contributing companies that emphasis is being shifted to fundamental studies in the laboratory where inhibitors and other means of alleviating corrosion will be investigated during the next fiscal year.

Support of studies being conducted by the University of Texas and the U. S. Bureau of Mines will be continued. Recognizing that such basic work is of an extended nature, the committee is advising personnel supervising fellowships to gear studies to several years' duration. Although the association's support of such studies is necessarily limited to increments of 1 year, it is anticipated that such support will continue to eventual solution of the corrosion problems undertaken. The committee continues for another year under the chairmanship of T. S. Bacon, chief engineer, Lone Star Gas Co., Dallas.

# TWO CAR LOADS of BRONZE and GALVANIZED FLEXIBLE STEAM HOSE

| SIZE | DESCRIPTION | PRICE FOB CHICAGO HOSE | COUPLINGS |
|---|---|---|---|
| ½" | TYPE S-1-C: BRONZE FLEXIBLE STEAM HOSE Mfr. American Metal Hose Co. 1" IPT Male & Female Removable cplgs attd | 60c ft | 3.00 set |
| ¾" | TYPE RT-15: BRONZE FLEXIBLE STEAM HOSE Mfr. Chicago Metal Hose Co. 1" IPT Male & Female Removable cplgs attd | 40c ft | 3.00 set |
| 1" | TYPE BD-15: BRONZE FLEXIBLE STEAM HOSE Mfr. American Metal Hose Co. 1" IPT Male & Female Removable cplgs attd | 58c ft | 3.00 set |
| 1¼" | TYPE BD-15: BRONZE FLEXIBLE STEAM HOSE Mfr. American Metal Hose Co. 1¼" IPT Male & Female Removable cplgs attd | 79c ft | 4.00 set |
| 2" | TYPE BD-15: BRONZE FLEXIBLE STEAM HOSE Mfr. American Metal Hose Co. 2" IPT Male & Female Removable cplgs attd | 1.30 ft | 6.50 set |
| 2½" | TYPE BD-15: BRONZE FLEXIBLE STEAM HOSE Mfr. American Metal Hose Co. 2½" National Standard Thread Male & Female removable cplgs attd | 1.40 ft | 9.00 set |
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# REFINING

## Robinson, Ill. Refinery Undergoing Expansion

ROBINSON, Ill.—A major program of new construction is under way at Ohio Oil Co.'s Robinson refinery, to fit the company to meet competition and produce more and higher-quality products. Part of the new units will replace older units which will be retired or utilized for other purposes, according to R. E. Luton, manager of the refining division.

The major process units include a new atmospheric-vacuum crude distillation unit, designed for processing 27,500 bbl. of Illinois or other crude per stream day. In addition a fluid catalytic cracking unit is designed for cracking 12,400 bbl. of charge per stream day. A Universal Oil Products catalytic polymerization unit to make 1,400 bbl. of high-octane-number polymer per stream day is to operate in connection with the cracking facilities of the refinery.

In addition two new boilers, each of 120,000 lb. of steam per hour, are to be installed, expanding the plant's steam-making facilities to more than 300,000 lb. per hour. Two new steam turboelectric generators, each of 5,000 kva. capacity are being built.

New storage is being installed, including 1,250,000 bbl. capacity. This storage includes space for both propane and butane, most of which is destined for L.P.G. consumption.

In addition a new tetraethyl lead blending unit is going in, with a rated capacity of 2,000 g.p.m. of finished blend. The main TEL storage tanks will contain 15,000 gal. of Ethyl fluid.

For the 500 employes of the refinery at present a new service center is designed, including dressing and shower rooms, cafeteria, and other facilities. A new, 50,000-g.p.m. water cooling tower is also being installed, for cooling process and condenser water. This water is brought from about 5 miles away, obtained from wells sunk in a prehistoric stream bed; temperature of this raw water is constant at about 58° F.

The new crude unit will replace an older unit which now handles 17,000 bbl. per stream day. The existing plant includes also four Holmes-Manley thermal cracking units and one combination (Kellogg) unit. The refinery operates on Illinois crude, which is relatively low in sulfur (less than 0.5 per cent, normally). Provision is made in the new process units, however, for handling corrosive crudes if it later becomes desirable to do so, by the generous use of corrosion-resisting alloy steels.

All process engineering and design is being handled by Universal Oil Products Co., Chicago. Arthur G. McKee Co., Cleveland, is the contractor for all process units. J. F. Pritchard & Co., Kansas City, Mo., are contractors for all "outside" facilities including field piping, service building, pump houses, and miscellaneous items. Construction is well under way and the main units are expected to be completed late in 1948. Storage facilities should be completed by mid-June 1947. The new construction work is being handled by R. W. S. Musgrave, chief engineer.

This program is a major reconstruction plan for a refinery which has operated since before 1924, when it, as the old Lincoln Refining Co., was acquired by Ohio Oil interest.

H. E. Handy, refinery superintendent, and D. L. Winsett, assistant superintendent, will have charge of the operations when construction is completed.

*Ohio Oil Co.'s Robinson, Ill., refinery showing new construction under way*

## Phillips Acquires Control of Rocky Mountain Refineries

Control of Wasatch Oil Refining Co., Salt Lake City, Utah, and Idaho Refining Co., Pocatello, Idaho, has been acquired by Phillips Petroleum Co. through an exchange of stock.

Frank Phillips, chairman of the


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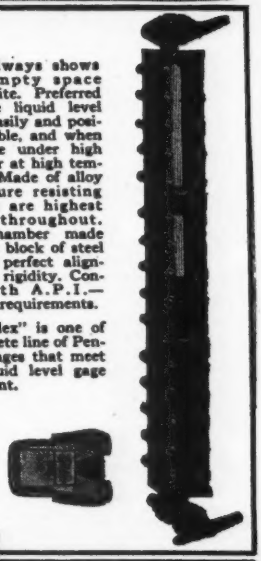

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board, and K. S. Adams, president, said the company exercised an option to acquire 80 per cent of the outstanding common stock of each of the companies in exchange for Phillips common stock.

The newly acquired companies own refineries at Salt Lake City and Pocatello, both with cracking facilities, and with a combined capacity of 6,000 bbl. daily. Phillips officials said operation of producing properties, refineries and marketing facilities will be continued under substantially the same management.

Both companies own producing and proven undeveloped acreage in Rangely field, where Phillips also has large crude reserves. Each company sells about 20 per cent of the total consumption of petroleum products in the state in which it operates.

## Aurora Gasoline Completes Small Fluid Cracking Unit

DETROIT.—The latest Fluid catalytic cracking unit to be built was completed recently at the Detroit plant of Aurora Gasoline Co.

This unit is of small capacity, probably of the order of 3,000 bbl. per day of gas-oil charge, and is using the newly developed microspherical catalyst, reported to have shown increased efficiency in cracking to produce motor fuels of improved anti-knock rating. It was designed by Universal Oil Products Co. of Chicago, which company licensed the Aurora company and was built under the supervision of Aurora and U.O.P. engineers. It is built on the new design especially for refineries of smaller capacity, featured by the use of a single main tower in which are included the catalyst regenerator and the cracking reactor.

## Cheyenne Plant Conversion To Be Completed July 15

Completion of a conversion program in Frontier Refining Co.'s Cheyenne, Wyo., plant, formerly Government owned, is scheduled for July 15. Contractor on the project is Walco Engineering & Construction Co., Tulsa.

The project includes converting the present reforming unit into a 1,400-bbl. Dubbs thermal cracker to process gas oil or other available cracking stock. Increases in both yield and quality of gasoline, together with lower over-all manufacturing costs, are expected to result.

## Shell Expanding Houston Synthetic Solvents Output

A new plant for the production of the synthetic industrial solvents, methyl isobutyl ketone and methyl isobutyl carbinol, is under construction at the Houston plant of Shell Chemical Corp. Production of the two solvents, now being manufactured by Shell Chemical on the West Coast, is scheduled to begin early this summer.

Contractor for the construction is C. F. Braun & Co. Cost is estimated at $2,200,000, including general plant facilities.

## Producers Refining, Inc., Installs Naphtha Unit

A new 500-bbl. naphtha unit is scheduled for completion this month in the West Branch, Mich., refinery of Producers Refining, Inc. The unit will produce rubber solvent, V. M. & P., and stoddard solvent.

C. G. Miller, plant superintendent, said the new unit was designed by C. S. Whitman, Kansas City, and is being built by plant personnel. The refinery has a crude capacity of 4,000 bbl. daily.

## Propane Production Added

Propane has been added to the list of products manufactured in the East Chicago refinery of Cities Service Oil Co. The plant has reached a production figure of 10,000 gal. daily.


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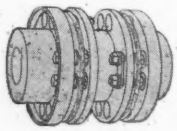
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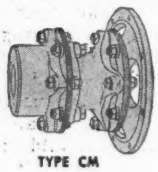
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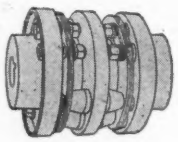
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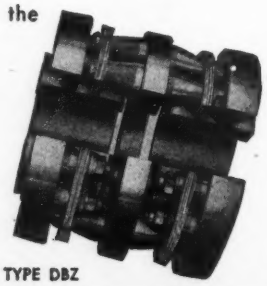
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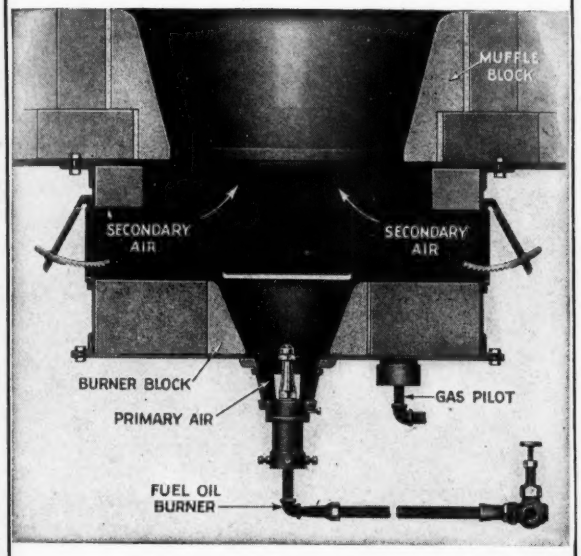


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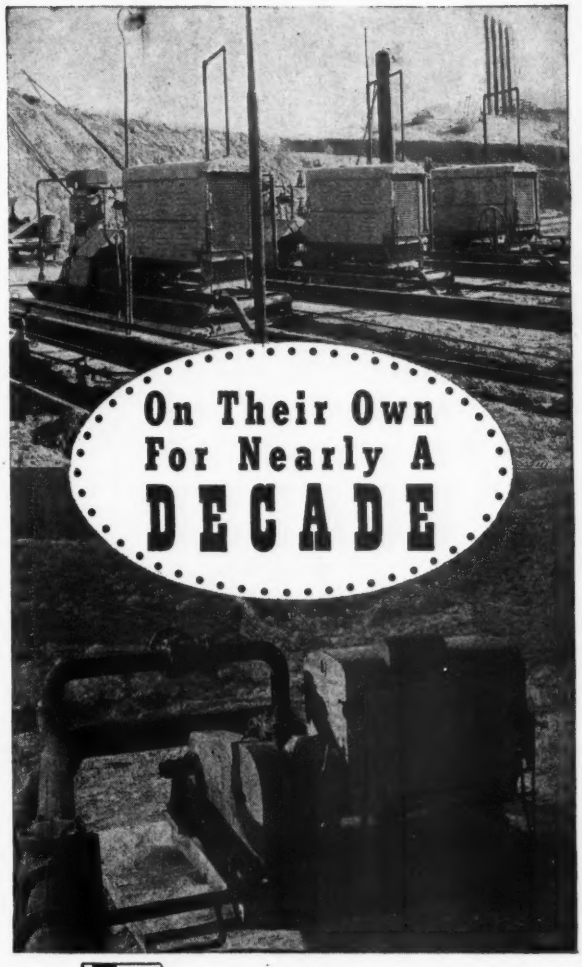

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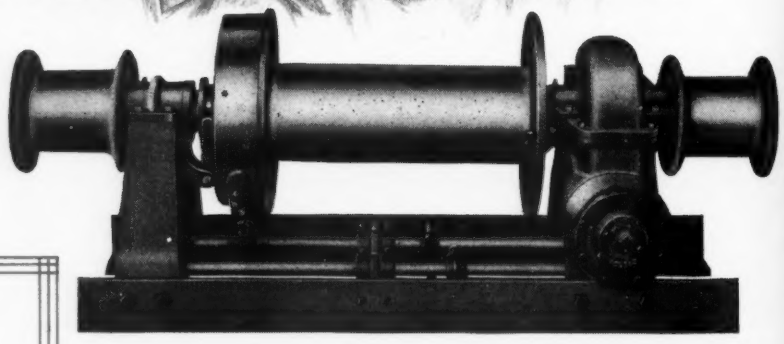

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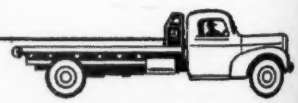


# PIPE LINES

## Plans Announced for Salt Lake-Rangely Line

PLANS for construction of a 181-mile, $5,000,000 crude-oil pipe line from Rangely field, Colorado, to Salt Lake City, Utah, have been announced by Standard Oil Co. of California.

R. G. Follis, president, said the line will have a minimum capacity of 25,000 bbl. daily. Construction, he said, will start next spring, with completion expected during the summer.

At present Rangely crude is transported via Stanolind Pipe Line Co.'s 10-in. line to Wamsutter, Wyo., and thence to Salt Lake City. Stanolind last week announced plans to increase the capacity of this line from 28,000 bbl. to 36,000 bbl. daily by installation within the next 2 weeks of a relay pumping station at Sunbeam, Colo.

The Standard of California line will parallel the Uinta Mountains much of the distance, crossing the range at Wolf Creek Pass at an altitude of 9,480 ft., highest point reached by a major trunk line in the United States, Follis said.

Tentative plans call for an initial pumping station at Rangely and a booster station at Talmage, Utah. The line will be of 10-in. pipe most of the way, Follis said.

Plans for the line are almost identical to plans announced more than 2 months ago by Utah Oil Refining Co. for a similar line to be built under supervision of Stanolind Pipe Line Co. *(The Oil and Gas Journal, May 3, page 114)*. Some doubt was expressed that both lines would be built.

Follis said plans for utilization and processing of the crude are not completed but that "all possibilities" are being explored, including construction of a refinery in the Salt Lake City area if warranted by developments.

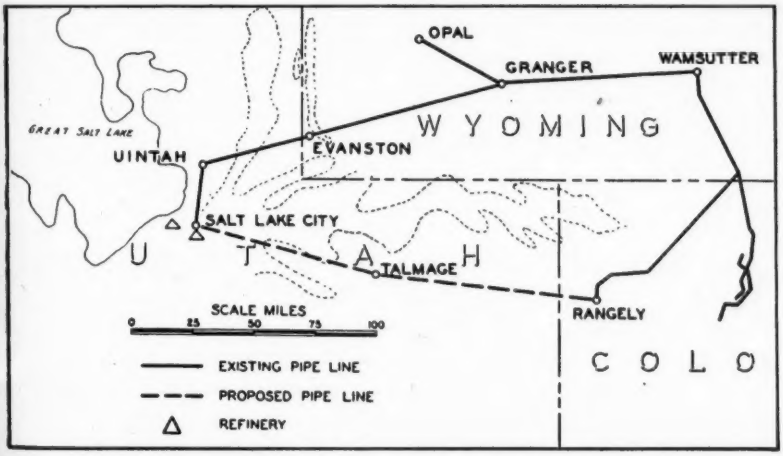
Present output of Rangely field is about 30,000 bbl. daily, largely determined by limited transportation facilities.

## Ohio Oil Authorized To Lay Wyoming Lines

Authority to construct and operate two crude-oil pipe lines has been granted Ohio Oil Co. by the Wyoming Public Service Commission.

The project consists of a line from Hidden Dome field and River Dome field in Washakie County to Durkee siding on the C.B.&Q. railroad, also in Washakie County, and a line from the company's present station and tank farm near Chatam, Washakie County, to Stanolind Pipe Line Co.'s station near Kirby in Hot Springs County.

Hearings on the Ohio Oil application were held April 8 in Cheyenne




***Route of crude line proposed by Standard Oil Co. of California is indicated by broken line. Dotted lines indicate position of Uinta Mountains in northeastern Utah. Solid line shows present pipe-line facilities. Salt Lake City now has two refineries, a 20,000-bbl. capacity refinery owned by Utah Oil Refining Co., and a 2,400-bbl. capacity plant owned by Wasatch Oil Refining Co., in which Phillips Petroleum Co. has just bought controlling interest***

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and in Casper May 8. Construction is to commence by June 30.

## Stanolind Lets Contract For Sugar Creek Line

Stanolind Pipe Line Co. has awarded a contract to McVean & Roberts, Odessa, Tex., for the construction of 17 miles of 16-in. crude-oil line extending from the station at Freeman, Mo., to the Sugar Creek, Mo., refinery of Standard Oil Co. (Ind.)

The line will replace an existing 8-in. line and will increase crude deliveries to the refinery which was recently expanded. Construction of the line is to start about July 15 with completion in about 30 days.

## T.G.&T. Pipe-Line System Visited by Newspapermen

The pipe-line system of Tennessee Gas & Transmission Co. was toured last week by a group of Tennessee, Kentucky, and West Virginia newspapermen as guests of the company.

Traveling by plane, the newspapermen were shown pipe-line construction near Holly Springs, Miss., a compressor plant at Greenville, Miss., compressor-plant construction at Natchitoches, La.; other T. G. & T. facilities and oil and gas production activities in the Kingsville, Tex., area.

## Agua Dulce-San Salvador 16-In. Line Is Completed

Tennessee Gas & Transmission Co. has completed construction of its 16-in. line from the Agua Dulce dehydration plant to San Salvador field, just north of Edinburg, Tex.

Construction was begun in February, under supervision of Walter Finley and C. E. Morgan, engineers, and A. C. Poulk, chief inspector.

The line will not be put into operation until completion of the San Salvador dehydration plant. The line was laid under contract by Associated Contractors & Engineers.

## Texas Pipe Line Awards Hearne-Dallas Contract

Contracts for pump-station site preparation work at Hearne, Tex., and for construction of a 172-mile products pipe line linking Hearne, Dallas, and Fort Worth, have been awarded by The Texas Pipe Line Co., according to R. B. McLaughlin, president of the company.

Associated Contractors & Engineers, Houston, was given the contract to build the pipe line. A 10¾-in. line will be constructed from Hearne to a terminal site at West Dallas, a distance of 146 miles, and a 26-mile

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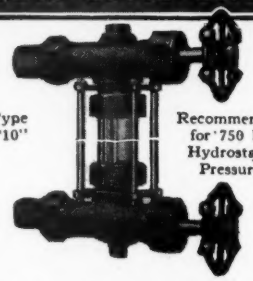


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8⅝-in. line from West Dallas to a terminal site at Fort Worth.

Preliminary work on the project will be started soon.

W. C. Wells, Jr., Beaumont contractor, was awarded the contract for clearing and construction of levees, tank grades, roads, and preparing the station site near Hearne. Work has been started.

## 16-In. Line to Store Gas For Cheyenne Consumers

A 11½-mile line of 16-in. pipe will be installed by Colorado Interstate Gas Co. south of Cheyenne, Wyo., for storage under pressure of natural gas to meet an anticipated fuel shortage this winter.

The storage pipe line will hold an estimated 5,000,000 cu. ft. of gas under pressure. With an estimated shortage of 1,000,000 cu. ft. daily expected on days when the mean temperature drops to —10° F., the unique system would take care of the shortage for 5 days without refilling.

Company officials indicated, however, the full storage will be maintained as nearly as possible at all times.

The 16-in. section will become a part of the proposed Denver-Cheyenne pipe line scheduled for completion in 1948. The balance of the line south to Denver will be of 8-in. pipe.

The company already has been ordered to restrict the installation of gas-using space heaters in view of the expected shortage. It has under consideration the storage of liquefied petroleum gases and their blending with natural gas to increase the fuel supply.

## FPC Approves Inch Lines Centrifugal Compressors

WASHINGTON.—The Federal Power Commission has authorized Texas Eastern Transmission Corp. to install four compressor stations on the Inch lines instead of the three authorized in March. Two are to be centrifugal blower-type compressors of 7,500 hp. each, and two reciprocating-type compressors of 7,000 and 6,000 hp. The stations are designed to increase delivery capacity of the Inch lines to 265,000,000 cu. ft. a day. Meanwhile, a new allocation of gas brought through the Inch lines to the Appalachian area was announced by FPC. The new allocation includes Panhandle Eastern Pipe Line Co. 20,000,000 cu. ft. per day and United Natural Gas Co. 10,000,000 cu. ft. per day. Remaining deliveries are apportioned as follows: Columbia Gas system, 48 per cent; Consolidated Natural Gas system, 40 per cent; Equitable Gas Co., 10 per cent; and Carnegie Natural Gas Co., 2 per cent.

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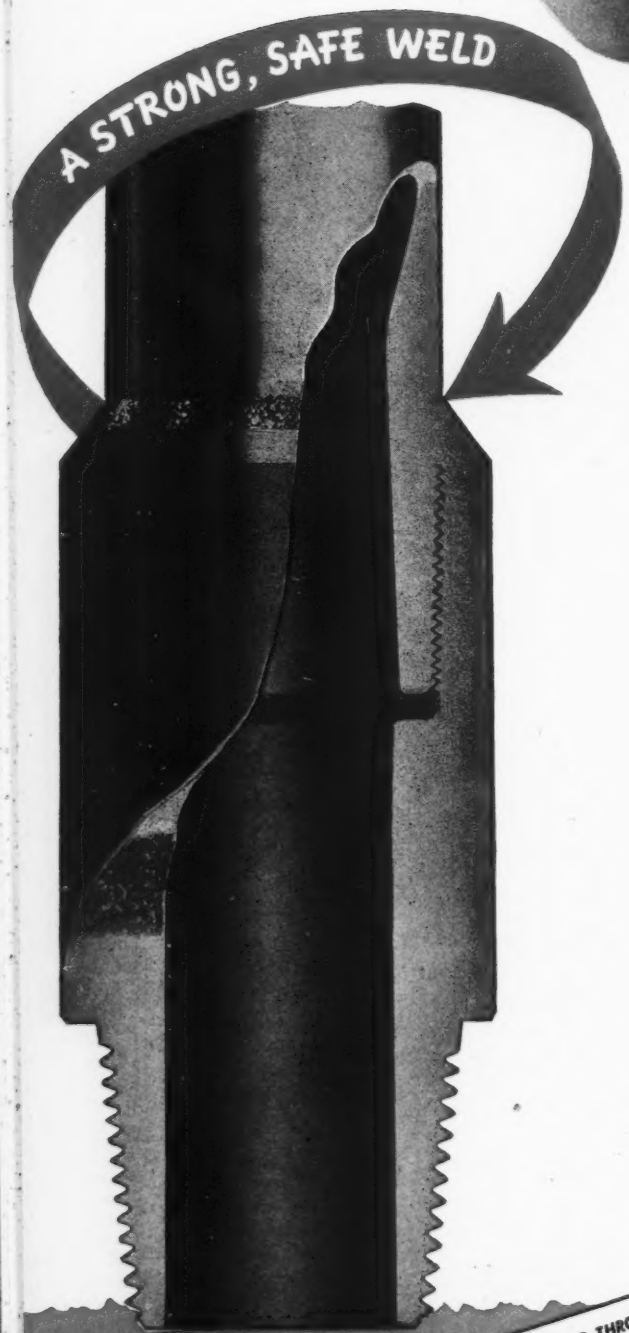


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## Counterbore Weld
(PATENTED)
# TOOL JOINTS

If you prefer your tool joints welded onto your drill pipe, the Reed Counterbore Weld Tool Joint is your answer.

The Reed three-bead process of welding produces a strong, sturdy weld, as each bead is normalized when the next bead is applied. Deep penetration provides maximum holding capacity, and effective distribution of stresses is assured.

Reed's shop practice of welding, with the drill pipe and tool joint held at a 45 degree angle, assures a better welding job than that usually obtained with the pipe held on a horizontal plane.

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# TOOL JOINT *design*

## EVERY REQUIREMENT

# REED

## *Super Shrink-Grip* TOOL JOINTS

**HAND APPLICATION OR REPLACEMENT** *Anywhere*

**1** **The "Shrink Grip Safety Area"** supports the drill pipe against bending and failure at last engaged thread. Seals against leakage.

**2** **The gauging shoulder** assures proper make-up and seals against leakage.

**3** **Threads with a wide crest and root** assure a dependable connection.

**4** **Accurate alignment** between all tool joint and pipe threads reduces torsional stresses and the hazards of costly failures.

★**Hand application at the rig** reduces application and replacement cost.

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Water . . . Oil . . . Chemical . . . Paint Detergents . . .

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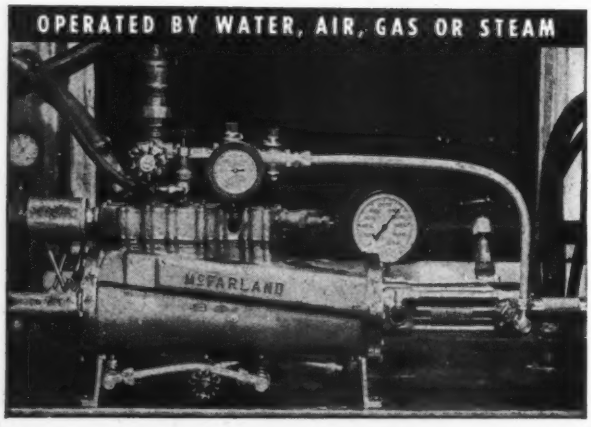


McFarland Hydrostatic Testing Unit. Discharge pressures up to 20,000 p.s.i. are available, even with operating pressures as low as 60 p.s.i.

McFarland Units are efficient, automatic, power units designed to boost the pressure of any liquid to any desired discharge pressure. Each unit is completely self-contained . . . no separate *engine or motor* is required.

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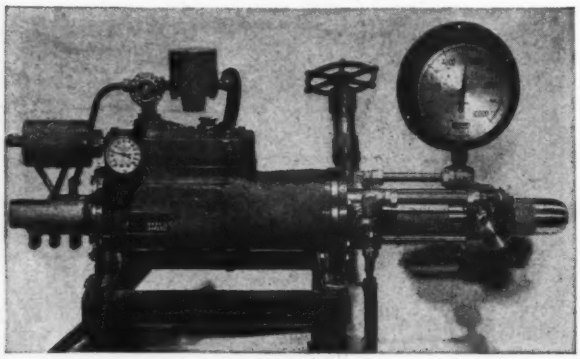
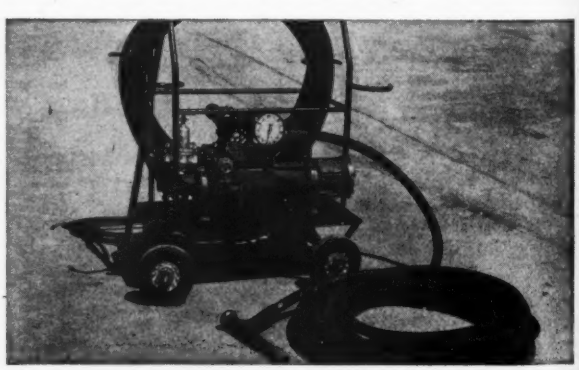
McFarland Units contain no gears, bearings or belts. Lubrication is required at only three points. Main casting and most parts are of high quality aluminum bronze, with great resistance to salt water corrosion, erosion and abrasion. Units are non-sparking and may be used with complete safety in refineries and other industries where fire hazards are great. For handling paint, chemicals and detergents, units can be arranged so that discharge fluids do not enter the main body of the unit.

If your operations involve discharge of *any liquid* under pressure, investigate McFarland Units. You'll find they do their job more efficiently, more economically and with a very minimum of maintenance.



McFarland Chemical Injector. This unit will inject against pressures up to 6000 p.s.i.



McFarland Unit (right) for high pressure washdown of automobiles, trucks, airplanes and other equipment.

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# Exploration and Drilling

## Another E. Texas County Produces

SAN AUGUSTINE County has been added to the list of East Texas counties that produce oil or gas. Hiawatha Oil & Gas Co. (Benedum-Trees interests) and M. E. Davis et al 1 W. A. Johnson, in the Edmund Quirk Survey, 3¾ miles north of the town of San Augustine and 1 mile west of Bland Lake has found oil in the Pettit zone of the Glenrose, Lower Cretaceous. The nearest important Pettit production is in Carthage gas field, about 40 miles north in Panola County.

The well was first brought in flowing from 85 to 100 bbl. of oil per day, gravity reported about 42° through 5/32-in. choke, after perforating with 180 shots opposite the Pettit lime at 8,130-60 ft. It was drilled to total depth of 8,977 ft. Flowing pressures on 5/32-in. choke were 800 psi. on tubing and 1,600 psi. on casing. On a ¼-in. choke, the well flowed about 5 bbl. per hour.

After acidizing with 1,000 gal., the well picked up and flowed at the rate of 625 bbl. per day through a ¼-in. choke, with 590-psi. pressure on casing and 660 psi. on tubing. The gravity picked up to 46°. A later gage, on ⅛-in. choke, reported a flow of 8 bbl. per hour, tubing pressure 1,000 psi., and casing pressure 1,200 psi. Still another report gives a 24-hour gage of 100 bbl. through a 9/64-in. choke, flowing pressures, tubing 1,450 psi., casing 2,150 psi. Unofficial reports credit the well with 7 ft. of good pay in the 30-ft. interval.

Pettit production this far south was a surprise, at least to some geologists, and reexamination of the territory between the discovery and Carthage pool is certain.

## TEXAS GULF COAST

### New Gas Pay Found in Matagorda Bay Field

HOUSTON.—The Texas Co. has opened a new gas pay in the Matagorda Bay field, Calhoun County. The 1 State of Texas, in Tract 118, in Matagorda Bay, 4½ miles north of Port O'Connor, topped the new pay at 4,718 ft., and flowed an initial production of 40,000,000 cu. ft. of dry gas per day on open flow. Total depth is 5,671 ft. and production is through perforations at 4,716-22 ft.

The Kittie field in Live Oak County has been extended ½ mile to the southwest by Henshaw Brothers and E. H. Smith 1 Walter Sippell, in the Michael Caronican Survey 35. Total depth is 2,808 ft., with top of pay at 1,850 ft. No gage was made of gas production, and well has been shut in with tubing pressure of 750 psi. Production is through perforations at 1,850-53 ft.

Forest Oil Co. 1 Obelgoner, wildcat in Lavaca County, approximately 2 miles north of Halletsville, ran 25 minute drill-stem test at 7,924-32 ft. in the Wilcox zone, using 1,500-ft. water cushion, developed 550 psi. working pressure through ¼-in. chokes top and bottom, recovered the cushion plus 280 ft. of 39.9°-gravity oil and 165 ft. of oily mud. Bottom-hole pressure 2,800 psi. open ad 3,425 psi. closed. On a previous drill-stem test at 7,510-20 ft., well had showed for gas-condensate production. Operators are now drilling ahead below 8,100 ft. This well is located in the James Campbell Survey 2.

American Republics Corp. 1 Kirby Petroleum Corp. et al, wildcat test 5 miles west-southwest of Fred and approximately 3 miles north of North Beach production, Tyler County, in Sarah Fields Survey, is setting production pipe with hole bottomed at 10,757 ft. Logs were run to total depth and sidewall samples were taken prior to setting of casing. On a drill-stem test from 9,066-80 ft. this well flowed 42°-gravity oil through a ¼-in. choke with good working pressures.

There were 28 new locations reported this week, 12 being wildcats, 2 each in Bee, Calhoun and 3 in Jackson, with 1 each in Chambers, Goliad, Polk, San Jacinto and Victoria counties.

#### TEXAS GULF COAST SUCCESSFUL WILDCATS

Calhoun County: New gas pay Matagorda Bay—The Texas Co. 1 State of Texas (Tr. No. 118), in Matagorda Bay, 4½ mi. N of Port O'Connor in Tract 118, top pay 4,716 ft., TD 5,671 ft., perf. 4,716-22 ft., IP: 40,000,000 cu. ft. dry gas per day on open flow, no water.

Live Oak County: Extension to Kittie field—Henshaw Bros. and E. H. Smith 1 Walter Sippel, ½ mi. SW extension, in Michael Caronican Sur. 35, top pay 1,850 ft., TD 2,808 ft., perf. 1,850-53 ft., IP: gas well, no gage, shut in, TP 750 psi., no water.

#### TEXAS GULF COAST WILDCAT FAILURES

Bee County: Earl Rowe et al 1 Genevieve Carlisle, in Felix Hart Sur., 1½ mi. W of Papalote, dry, TD 5,904 ft.

Gonzales County: Humble 1 Allie Barnett, in D. B. Dillard Sur., 8 mi. NE of Smiley and 12 mi. SW of Gonzales, dry, TD 8,686 ft.

Liberty County: Humble 1 Cora E. Wimer et al, in North Hardin area, Jas. Knight Sur., 3 mi. N of Hardin field production, dry, TD 12,003 ft.

Orange County: J. W. Frazier et al 1 Miller-Vidor Lbr. Co., in M. J. Brake Sur., 3 mi. SW Vidor townsite and 6½ mi. SW of No. 1 Vidor discovery production, dry, TD 8,720 ft.

Houston Oil Co. of Texas 1 Houston Oil Co. of Texas and American Rep. Corp. fee, I&GN Sur., Sec. 12, 6 mi. NE of Vidor townsite, dry, TD 8,607 ft.

Refugio County: Arnold O. Morgan 1 Katherine Schroeder, in T. Y. Antonio Galan Grant, 5 mi. N of Bayside, dry, TD 7,014 ft.

San Jacinto County: The Salt Dome Oil Corp. et al 1 E. K. Sowash, J. M. De La Garza Sur., 8 mi. SW of Evergeen townsite, dry, TD 4,710 ft.

Walker County: H. C. Bishop et al 1 G. W. Beardsley Est., in L. M. Collard Sur., just north of New Waverly townsite, dry, TD 5,003 ft.

## EASTERN TEXAS

### San Augustine County Gets First Oil Production

DALLAS.—San Augustine County's first oil production, at M. E. Davis et al 1 W. A. Johnson, located 3¾ miles north of the town of San Augustine, Edmond Quirk Survey, has been termed a good oil well, although not in the flush production class. It is high-gravity oil, has a low gas-oil ratio, and no water has been reported.

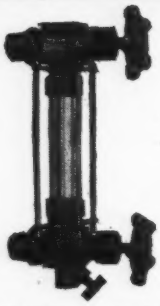
Operators loaded the hole with 86 bbl. of oil, then attempted to acidize the Pettit formation through perforations at 8,130-60 ft. with 1,000 gal. of mud acid. The formation would not break down under 2,600 psi. pressure, and it was allowed to clean itself before turning into tanks. On a 4-hour test, flowing through ¼-in. choke, it made 13 bbl. of oil the first hour, 22.7 bbl. the second hour, 17.75 bbl. the third hour, and 17.8 bbl. of oil the fourth hour. During this period the flowing tubing pressure increased from 650 to 795 psi. Gas-oil ratio was estimated at 1,050 cu. ft. and gravity of the oil is 42.6°, A.P.I.

Total depth of the well is 8,978 ft. in sand and shale. On first tests, through the same perforations, the flow was at the rate of 82.5 bbl. of oil a day, through 5/32-in. choke. Flowing tubing pressure was 810 psi., decreasing to 700 psi.

In Harrison County, 3½ miles west of Waskom, Byrd Oil Corp. 1 C. J. Cocke, was drilling below 5,717 ft. in shale and limestone. It reported a drilling break at 5,704 ft., and cores at 5,707-17 ft. recovered soft to medium limestone with a faint gas odor and taste, then gray limestone with streaks of shale, with no shows. Eight miles northeast of Marshall, Stanolind Oil & Gas Co. 1 George Slaughter was drilling below 5,945 ft. in shale and limestone. A drill-stem test with packer at 5,862 ft., open 30 minutes, produced no surface pressure, but recovered 30 ft. of drilling mud. Another 30-minute test at 5,870-5,900 ft. recovered 4,900 ft. of salt water cut with gas. Bottom-hole flowing pressure was 1,300 psi., increasing to 2,300 psi. when shut in.

The Chicago Corp. 1 Evie McDaniels, 10,000-ft. Smackover test 2 miles northeast

PENBERTHY
"ALL IRON"
LIQUID LEVEL GAGES



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of Dotson, Panola County, had total depth at 6,371 ft. and was coring ahead. A drill-stem test at 6,335-46 ft., open 30 minutes, had a slight blow. Recovery was 90 ft. of salt water and mud cut with gas.

**EAST TEXAS WILDCAT FAILURES**

Cherokee County: John R. Bunn 1 Mac & B. G. Allen, Wm. Gates Sur., ½ mile S Summerfield, dry, TD 4,562 ft., sample tops: base Austin 4,277 ft., Woodbine 4,278-88 ft., no shows.

Fannin County: W. H. Taylor 1 J. W. Jones, MEP&PRR Sur., 6 mi. N Honey Grove, dry, TD 3,508 ft. in precambrian, no shows.

Robertson County: Carter Jones 1-A Lassiter, Wm. Thomas Sur., Bremond area, dry, TD 5,135 ft. in Georgetown limestone, Austin chalk 3,800-4,005 ft.

# SOUTH LOUISIANA

## Lafayette Parish Gets New Condensate Pool

NEW ORLEANS.—Sohio Petroleum Co. and Union Sulphur Co., Inc. 1 Harson Unit "A," discovery well of Scott-Duson gas-condensate pool, Lafayette Parish, has been completed for an initial production of 18 bbl. of condensate per day and 1,750,000 cu. ft. of gas per day through a 10/64-in. choke. Gas-condensate ratio 95,000. Tubing pressure 3,250 psi., gravity 51.3°. Total depth is 12,067 ft., with production through perforations at 10,840-856 ft. This well is located in Section 5-10s-3w, 11 miles east and little north of Crowley field of Acadia Parish.

Sun Oil Co. 1 Louisiana Farm & Livestock Co., 7-11s-9w, a new oil pool opener 2 miles west of gas production at East Moss Lake field, Calcasieu Parish, is shut in awaiting storage. This well was drilled to a total depth of 10,152 ft., and operators encountered trouble with loss of circulation and it was plugged back to 9,104 ft. and perforations made at 8,996-98 ft. A drill-stem test using ¼ and ⅛-in. chokes recovered four stands of oil, seven stands of salt water, and a stand and a joint of sand. Perforations were squeezed and new ones made with 32 shots from 8,970-78 ft. The well cleaned and flowed pipeline oil through a ⅛-in. choke with 950 psi. on the tubing and 700 psi. on casing. Shut-in pressure is 1,350 psi.

Humble Oil & Refining Co. 1 State-Atchafalaya Bay, State Lease 734, off St. Mary Parish shore, is standing with a cement plug in the hole from 9,415-9,615 ft. after drilling was interrupted by a gas kick while drilling hole at 11,728 ft. Protection pipe, 9⅝ in., is in the hole to 10,000 ft. This test is projected to 13,000 ft.

Magnolia Petroleum Co. 1 State Lease 684, Block 94, wildcat test off St. Mary Parish shore, was coring ahead below 2,576 ft. after regaining circulation at 2,557 ft. This test is projected to 3,000 ft.

Thirteen new locations, all in proven areas, were reported this week. One successful wildcat, a new gas-condensate pool opener in Lafayette Parish, and three dry wildcats were completed, one each in Ascension, Iberia and St. Helena parishes.

**SOUTH LOUISIANA SUCCESSFUL WILDCATS**

Lafayette Parish: New gas-condensate pool, Scott-Duson—Sohio Pet. Co. and Union Sulphur Co. 1 Harson Unit "A," 5-10s-3w, top sand 10,840 ft., TD 12,067 ft., perf. 10,840-856 ft., IP: 18 bbl. condensate and 1,750,000 cu. ft. gas per day through 10/64-in. choke, TP 3,250 psi., gravity 51.3°, no water.

**SOUTH LOUISIANA WILDCAT FAILURES**

Ascension Parish: Texas Co. 3 United Lands Co., Sorrento Dome area, 2 mi. E of production, 1-10s-4e, dry, TD 12,983 ft.

Iberia Parish: Humble Oil & Refg. Co. 2-B J. M. Burguieres Co., Ltd., Weeks Island area, 44-14s-7e, dry, TD 12,801 ft.

St. Helena Parish: Magnolia Pet. Co. 1 Hampton-Davis, 55-2s-5e, 2 mi. W of Greensburg townsite, dry, TD 10,041 ft., top Cockfield 5,790 ft., Cook Mt. 6,022-6,111 ft., Winona 6,332 ft., Wilcox 6,835 ft.

# PERMIAN BASIN

## Jameson Field Continues To Expand

MIDLAND.—Sun Oil Co. last week continued expansion of its Jameson field in northwestern Coke County. The seventh test started and the fifth producer, its 1 W. I. Tubb, northwest of the discovery, recovered 1,900 ft. of clean oil and 1,090 ft. of oil and gas-cut mud, on a 1-hour drill-stem test at 6,286-6,75 ft. Bottom-hole flowing pressure was 1,300 psi., increasing to 3,400 psi. when shut in. Location is ⅛ mile north and ¼ mile west of the 1 Allen Jameson, giving the area an approximate ⅜-mile extension. Earlier tests at this well, at 6,270-83 ft., recovered only gas-cut mud, with no oil or water. Meanwhile, Sun's 2 Allen Jameson, north offset to the discovery, had apparently missed the Crinoidal pay section, and was drilling ahead below 6,810 ft. A 1-hour test at 6,690-6,765 ft. recovered 6,150 ft. of salt water, slightly cut with gas. Later completions in the field have been running consistently ahead of the first wells. The 2 Fred Jameson, in Section 315, Block 1-A, completed last week for a flowing potential of 427 bbl. of oil a day, through ¼-in. choke on tubing. Gas-oil ratio ran 1,400 cu. ft.; flowing pressure was 1,060 psi., and casing pressure 1,475 psi.

Cities Service Oil Co. is continuing tests at its western Crockett County lower Permian limestone discovery in an effort to lower the gas-oil ratio. Perforations at 5,660-70 ft. were squeezed off when the gas oil ratio ran approximately 2,500:1 on a flow of 180 bbl. of oil a day. Operators planned to test lower levels but it was said this would approach the indicated water table. Earlier, a drill-stem test at 5,670-5,725 ft. recovered 4,260 ft. of oil, 60 ft. of mud and 637 ft. of salt water.

Small shows of oil were reported at Magnolia Petroleum Co.'s 1-DD Walton, Section 7, Block 3-B, an old well being deepened from 3,695 ft. in the Colby sand zone. Location is on the west side of the Keystone (Colby) area. Drilled out to 4,545 ft., a 47-minute drill-stem test at 4,256-45 ft. recovered 4 ft. of drilling mud, having a slight show of oil. From 4,545-59 ft. cores recovered 4 in. of light gray dolomite, being 30 per cent porous and 30 per cent stained with light oil.

Pure Oil Co. and Humble Oil & Refining Co. announced plans to drill deeper at their 1 E. P. Cowden, in southwestern Andrews County, to test the Ellenburger. Latest reported drill-stem test in the Clear Fork, at 7,303-7,410 ft., recovered the water cushion, salt water and some gas-cut drilling mud; then 270 ft. of oil and gas-cut drilling mud, turning to drilling mud and later 3,060 ft. of salt water.

In Upton County, near the Reagan County line, reports were that Slick-Urschel Oil Co. would make an Ellenburger test out of the old 1 D. L. Alford. This well was abandoned in 1941 as dry in the Devonian limestone at total depth of 10,384 ft. Operators were preparing to set whipstock at 9,300 ft. to drill by junk in the hole from there to total depth. Plans are to carry it to 12,000 ft., if necessary, to reach the Ellenburger.

In eastern Midland County, 15 miles southeast of Midland, Humble 1 Mabel Floyd was testing the lower Permian at 9,450-9,510 ft. This well had previously shown for possible commercial production but after acidizing with 2,000 gal., and swabbing down, it would not flow. Twelve hours of swabbing nothing but acid water

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# AUTOMATIC WELL SERVICING MAST

This is a highly portable unit providing the fastest and most economical means of servicing wells to approximately 5,000 ft. The unit is complete with mast, truck and powered hoist. Only a very short time is required to position the truck at the well, level the truck frame and raise the mast to its operating position.

The mast raising is entirely automatic, being powered through a standard power take-off from truck transmission. A simple locking device retains the mast in the operating position.

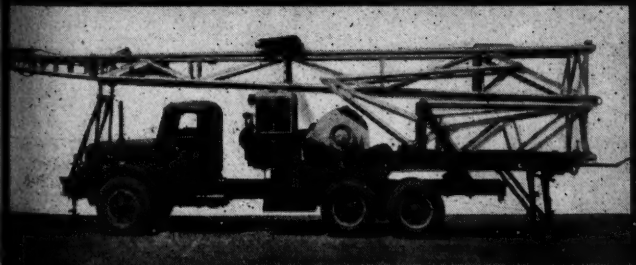
Alloy steel square tubular legs and other tubular construction insures maximum strength and rigidity with minimum weight. All pivot points in the folding mast are equipped with roller bearings to insure lightness and long life.

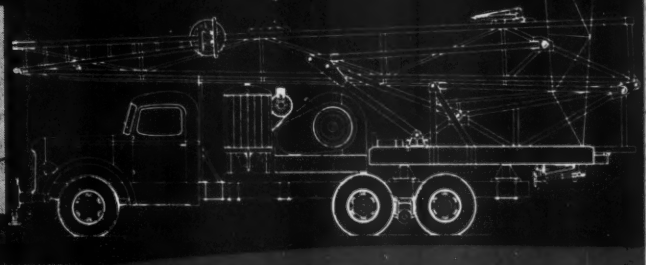
Additional savings of time and cost reductions are realized by the complete elimination of ground guys and earth anchors. Built-in guy lines extending from front end of truck to top of mast are used only occasionally for extremely heavy pulls.

The mast is complete with rod hanger bracket, rod platform and folding tubing platform which can be attached to suit range I doubles or range II singles. Rods are pulled and hung in doubles. Hook load capacity is based on 6,000 ft. of rods being hung in the mast.

The standard 63 ft. Automatic Well Servicing Mast has a capacity of 66,000 lbs. hook load with three lines to tubing block: front legs of 4" square X-4130 steel tubing, 2-24" manganese steel roller bearing crown sheaves grooved for 7/8" wire line, mounted on 4" diameter hardened and ground shaft. Mast complete with rod platform and tubing platform with non-slip steel flooring; tubing platform to accommodate 100 stands of 2½" tubing with positions provided to rack range I doubles or range II singles. Over-the-road dimensions 12'-3" high and 35 ft. long; with Unit Rig U-24 hoist with power, or with Cardwell Model H hoist with power, all mounted on International Model K-11-F truck.

Same unit as above with Unit Rig U-24 hoist with power, or with Cardwell Model H hoist with power, all mounted on Mack LFSW truck.





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left the fluid level 3,000 ft. from the surface.

**WEST TEXAS SUCCESSFUL WILDCATS**

Crane County: Gulf Refining Co. 1 HH University, Sec. 3, Blk. 31, University Lands, Ellenburger discovery 3½ miles N of Block 31 field, flowed 405 bbl. oil first 3 hours, 405 bbl. second 3 hours of 6-hour potential test, daily potential 3,236 bbl. of oil, GOR 733:1, gravity 46.3°, tubing pressure 425 psi., top Ellenburger 10,580 ft., pay zone 10,615-875 ft., elevation 2,659 ft.

Sutton County: S. B. Roberts et al 1 John I. King, Sec. 26, Blk. K, GH&SA Sur., 19 mi. NE Sonora and 1½ mi. SE Page gas field, TD 5,475 ft., PB 3,761 ft., gas pay 3,670 ft., flowed 3,000,000 cu. ft. gas a day, top Palo Pinto 3,600 ft., Blue shale 3,760 ft., elevation 2,314 ft., shut in.

**WEST TEXAS WILDCAT FAILURES**

Coke County: Union Oil Co. of California 1 Jim McCutchen, Sec. 444, Blk. 1-A, H&TC Sur., 3 mi. E Robert Lee, dry, TD 6,746 ft., Reef limestone 5,000 ft., Ellenburger 6,304 ft., DST 6,308-27 ft., recovered heavily oil and gas-cut mud, DST 6,694-6,746 ft. recovered salt water with only scum of dead oil, elevation 1,921 ft.

Ector County: Cities Service Oil Co. 1-H TXL, Sec. 45, T&P Sur., 2½ mi. SE TXL field, dry, TD 6,523 ft., Yates 2,890 ft., Glorietta 5,410 ft., San Andres 4,210 ft., San Angelo 5,290 ft., Clear Fork 5,660 ft., elevation 3,223 ft., slight show of gas 5,840-5,950 ft.

Hockley County: George P. Livermore, Inc. 1 Nellie S. Deloach, Reeves CSL Sur., 3 mi. NE Whiteface, dry, TD 4,845 ft., anhydrite 2,140 ft., San Andres 3,830 ft., elevation 3,644 ft., no shows.

**SOUTHEASTERN NEW MEXICO**

HOBBS.—A large producer was completed last week on the southern tip of the West Eunice field, Lea County. Wilson Oil Co. 2 State, SE NE SW 23-21s-34e, made a daily flowing potential of 2,500 bbl. of oil, plus an estimated 1,000,000 cu. ft. of gas a day, from limestone pay at 3,736-40 ft., total depth.

**SOUTHEASTERN NEW MEXICO WILDCAT FAILURE**

Eddy County: M. W. Jones 1 Jones-State, SE SE SW 12-19s-27e, dry, TD 3,043 ft. in limestone, no shows.

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# N. CENTRAL TEXAS

## Ellenburger Tests Look Promising

WICHITA FALLS.—Possibility of Ellenburger production was indicated last week in central Shackelford County at Hickok & Reynolds, Inc. 1 Merrick Davis. Duration of the drill-stem test was not disclosed, but recovery from 4,957 ft., 27 ft. in the Ellenburger, was 90 ft. of oil and gas-cut mud, plus a good flow of gas. Operators were to set casing for production tests. Location of the well is on the southwestern edge of the shallow Hope sand field, west of Albany.

Ellenburger production was also indicated at Helmerich & Payne, Inc. 1 A. O. Mahler, in the Hopson Survey about 5 miles south of Wichita Falls, of northern Archer County. A drill-stem test from top of the zone at 5,471-5,485 ft., open 15 minutes, recovered 60 ft. of oil and gas-cut mud. Bottom-hole pressure was 1,600 psi. Operators were to deepen to 5,540 ft. and run electric survey.

Three miles south of the town of Throckmorton, James H. Snowden 1 Bailes-Parmenter-Jones Unit, Section 296, BBB&C Survey, had prospects of opening a new area of Caddo limestone production. A drill-stem test of the limestone at 4,225-44 ft. brought gas to the surface in 4 minutes, and oil in 14 minutes, after which it was allowed to flow for 15 minutes before being shut in. No estimate was made on the amount of flow or on the gravity of the oil. Operators were to set casing to the top of the formation before making further tests. Nearest major production is about 7 miles southeast of the townsite in the Parrot (Caddo) area.

Tom A. Hunter's 1 J. B. Mathews, a wildcat in Block 60, Comanche Indian Reserve Lands, and 10 miles southwest of Throckmorton, drilled the plug on the Caddo at 4,487 ft. and when cleared, reported a flow of 2 bbl. of oil an hour through 12/64-in. tubing choke. Operators may acidize before further tests are made.

**NORTH CENTRAL TEXAS SUCCESSFUL WILDCAT**

Jack County: Ashland Oil & Refining Co. 1 Henderson, I. Hughson Sur., A-256, ¾ mi. SW Bryson, flowed 23.5 bbl. oil in 6 hours, 16/64-in. choke, casing pressure 600 psi., tubing pressure 400 psi., GOR 1,478 cu. ft., 40°-gravity, potential 94 bbl. oil a day, sand pay 3,261-75 ft., TD.

**NORTH CENTRAL TEXAS WILDCAT FAILURES**

Archer County: Cochran & Cain 1 Mrs. J. H. Turbeville, Blk. 49, J. W. Harris Subd., 11 mi. NW Archer City, dry, TD 1,435 ft. in sandy shale, Gunsight lime 1,412 ft.

Ralph Harper et al 1 W. Duckworth, John Llewellyn Sur., A-256, 10 mi. SW Archer City, dry, TD 1,478 ft., sand with slight show of oil 1,458-62 ft.

Cooke County: Davidor & Davidor 1 R. W. Trew, Thomas Carson Sur., A-203, 3 mi. SE Myra, dry, TD 1,990 ft., sand with show of oil 905 ft., Ellenburger 1,950 ft.

W. O. Russell 1 C. E. Burks, George G.

Steele Sur., A-1,061, 6 mi. SE Muenster, dry, TD 2,044 ft., sand with show oil 1,781-84 ft., Ellenburger 2,016 ft.

**WEST CENTRAL TEXAS SUCCESSFUL WILDCAT**

Taylor County: J. Ralph Steward 1 George Miller, Sec. 50, Blk. 19, T&P Sur., 3 mi. W Merkel, pumped 40 bbl. oil a day, plus 30 bbl. water, Noodle limestone 2,567-78 ft., TD.

**WEST CENTRAL TEXAS WILDCAT FAILURES**

Callahan County: Standard Oil Co. of Kansas 1 Kate Womack, George Eubanks Sur. 165, 6 mi. SW Cross Plains, dry, TD 3,964 ft., Barnett shale 3,612 ft., Mississippi 3,743 ft., Ellenburger 3,781 ft., elevation 1,673 ft.

Jones County: William H. Hunt 1 W. E. Camp, Stephen M. Hale Sur. 251, 2 mi. W Hawley, dry, TD 3,510 ft., sand with slight show oil 2,062-66 ft., Swastika limestone 2,568 ft., show oil 2,737-41 ft., Reef limestone 2,684 ft., elevation 1,707 ft.

# MISSISSIPPI

## Washington County Test Being Watched

JACKSON.—A new wildcat test for Washington County, 3 miles northeast of Longwood, is being watched closely. The venture, C. H. Murphy and Sun Oil Co. 1 Currey, 2-15n-8w, was last reported drilling below 4,921 ft. Cores at 4,864-69 ft. recovered ashy, porous sandstone, with no shows. At 4,869-74 ft. the recovery was conglomerate volcanic, ashy sandstone, and at 4,897-99 ft. it recovered quartz, chert and pebbles. Base of the volcanic was 4,909 ft., by samples. Also in Washington County, 1 mile northeast of Muskedine, the same interests' 1 Federal Land Bank was drilling below 4,275 ft. in water-laid volcanics, topped at 4,060 ft., by samples.

Amerada Petroleum Co. 1 Dabney-Bonelli, in 9-18n-2e, Warren County, had total depth at 5,207 ft. in salt. Operators perforated at 3,594-97 ft. and 3,621-24 ft. These holes were to be squeezed off, then perforations made between them to check the base of the Wilcox.

Other wildcat activity included J. J. Broadus et al 1 Bank of Newton in 9-6n-11e, Newton County, which cored green-gray, waxy sand, fairly porous but having no shows, at 5,089-5,100 ft. In Rankin County, R. B. Lack and Nelson Exploration Co. 1 L. E. Ridgeway, 35-3n-2e, was drilling below 6,445 ft. in chalk, topped at 6,255 ft. Lion Oil Refining Co. 1 W. G. Sowell, SW SE 7-5n-5e, was drilling ahead below 3,845 ft.

**MISSISSIPPI WILDCAT FAILURES**

Copiah County: I. P. LaRue 1 Harris Heirs, SE SW 22-1n-3w, dry, TD 10,177 ft., Winona 3,240 ft., Wilcox 3,538 ft., Midway 6,846 ft., Selma 7,776 ft., Austin 8,350-8,740 ft., Tuscaloosa sand 8,956 ft., Marine Tuscaloosa 9,785 ft., Massive sand 10,010 ft., elevation 319 ft.

Jasper County: P. G. Lake, Inc. 1 M. C. Moulds, SW NW 27-4n-13e, dry, TD 5,471 ft., Midway 2,230 ft., chalk 2,770 ft., Eutaw 3,770 ft., Tuscaloosa 4,194 ft., Marine Tuscaloosa 4,892 ft., Massive sand 5,294 ft., elevation 382 ft.

Madison County: Gulf Refining Co. 2 J. R. Fancher, SW SW NW 25-10n-4e, dry, TD 5,200 ft., Wilcox 1,180 ft., Midway 3,134 ft., Selma 3,946 ft., Eutaw 5,014 ft., elevation 290 ft.

Marion County: Humble Oil & Refining Co. 1 C. Tullos, NW SW 12-1n-18w, dry, TD 10,990 ft., Wilcox 3,138 ft., Midway 5,938 ft., chalk 6,768 ft., Austin 7,478 ft., Tuscaloosa 7,950 ft., Marine Tuscaloosa 8,510 ft., gas-condensate sand 8,997-9,003 ft., flowed up to 2,000,000 cu. ft. gas a


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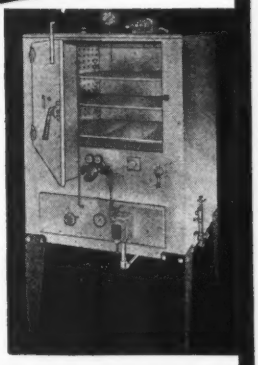

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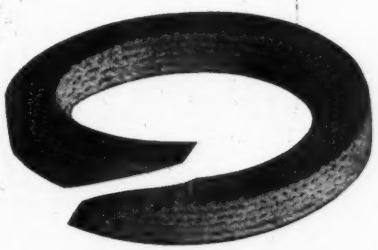

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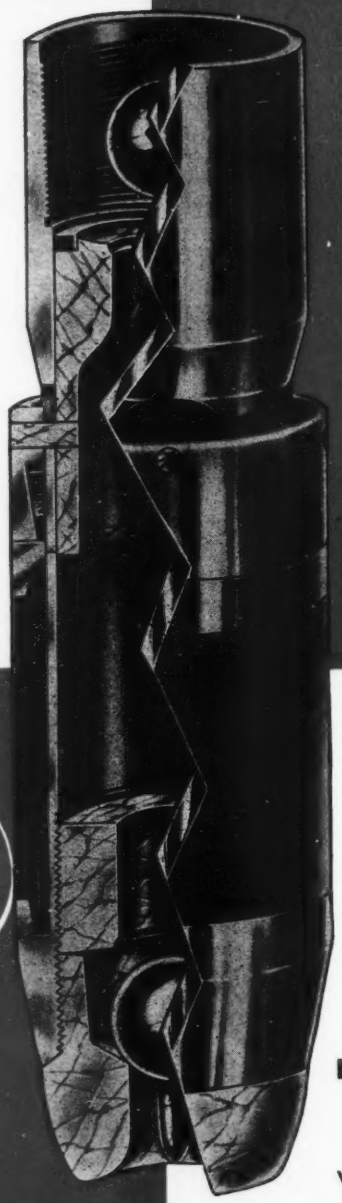

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day, plus 5 bbl. 57° condensate, continued testing showing increased salt water, elevation 128 ft.

Newton County: J. J. Broadus 1 Newton County Bank, NE SE 9-6n-11e, dry, TD 5,510 ft., Midway 2,107 ft., Eutaw 3,698 ft., Tuscaloosa 4,090 ft., Marine Tuscaloosa 4,857 ft., Massive sand 5,193 ft., Comanche 5,362 ft., elevation 489 ft.

Washington County: C. H. Murphy, Jr. and Sun Oil Co. 1 Land Bank, SE SE 19-16n-8w, dry, TD 5,020 ft., Wilcox 1,802 ft., Midway 3,042 ft., elevation 119 ft.

**FLORIDA WILDCAT FAILURE**

Collier County: Humble Oil & Refining Co. 3 Lee Cypress Co., SE SE 28-47s-29e, dry, TD 11,943 ft., slight show oil in tight limestone 9,764-85 ft., dolomite and anhydrite with slight show oil 11,554-77 ft., no formation tops reported.

# CANADIAN FIELDS

## Leduc 4 Makes 328 Bbl. Through ¼-In. Choke

CHATHAM.—Imperial-Leduc 4, LSD 16, 15-50-26w4, has finished in Devonian limestone at 5,361 ft. as the fourth and possibly the largest producer in the new field. The well was swabbed down to 2,450 ft., when it cleared itself and started to flow.

On being switched from flare to separator, it flowed 50 to 60 bbl. an hour for 3 hours, when it was shut in to install a ⅛-in. choke. After flowing 14 bbl., drilling mud clogged the hole, but the flow resumed when choke was stepped up to ¼-in. On a 24-hour test with ¼-in. choke, it flowed 328 bbl. with casing pressure 490 psi., tubing 460 psi., separator 200 psi. Gas-oil-ratio is slightly over 500 cu. ft.

On recent tests with 3/16-in. choke, Imperial-Leduc 1 flowed around 175 bbl. and No. 2 around 110 bbl. No. 3, increased from ⅛ to 5/32-in. went up from 94 to 162 bbl.

Completion of No. 4 as a producer definitely proves an area 3¼ miles northwest-southeast and over 1 mile across. The water contact has been defined only in the lower porous zone of Imperial-Leduc 2, 1¼ miles south and a little west of the discovery.

Imperial-Leduc 5, LSD 8, 21-50-26w4, is below 4,205 ft., Imperial-Leduc 6, LSD 1, 22-50-26w4, is waiting rig from No. 4 and Imperial-Leduc 7, LSD 4, 15-50-26w4, offsetting the discovery to the south, has derrick up. Imperial-Leduc 8 is a location in LSD 7, 26-50-26w4, a south offset to No. 3.

McColl-Frontenac 14-14, LSD 14, 14-48-27w4, outpost test to the south and west of the field, is below 2,508 ft. Globe-Leduc 2, LSD 9, 34-50-26w4, about a mile northwest of No. 3 producer, is below 110 ft.

**Wetaskiwin.**—In the Wetaskiwin area, south and east of the Leduc field, McColl-Frontenac 3-22, LSD 3, 22-46-23w4, is below 3,885 ft. after encountering a fair gas flow.

**Jumping Pound.**—On the Jumping Pound structure west of Calgary, Shell 5-7-1, LSD 5, 7-25-4w5, is below 10,398 ft. and deepening to test the Devonian limestone. The black lime of the Madison series at 10,037 ft. had a gas flow with a small naphtha recovery. This is the first attempt to test the Devonian limestone in this area of the foothills.

**Lloydminster.**—The Lloydminster field shows six wells completed drilling: Dalo 5, NW 9, 15-50-2w5; Lloydminster Oil Producers 4, NE 13, 11-50-2w4; Superior 6, NE 3, 14-50-2w4; B. & H. 1, NW 5, 1-49-28w3; Herschel 1, SW 14, 25-48-28w3; and Rogers & Bailey 1, NE 5, 35-48-28w3, are awaiting production rigs. There are three tests drilling and three rigging. Superior 4, LSD 6, 14-50-2w4, in the northwest extension of the field, finished at 1,989 ft., started flowing by heads between 25 and 50 bbl. daily.

# APPALACHIAN FIELD

## Greenbrier Rotary Test Drilling in Clinton

PITTSBURGH.—In Williamsport district, Greenbrier County, Texas Co. is drilling through the Clinton sand in the rotary wildcat on G. R. Dean farm with no drill-stem test yet made. Starting at an elevation of 2,573 ft., the Clinton was topped at 7,988 ft. and the bit is 74 ft. in that formation. The Oriskany showed some gas in a drill-stem test at 6,538-72 ft. and the Newburg horizon was logged at 7,458-7,550 ft. On Briery anticline in Portland district, Preston County, William E. Snee, Oriville Eberly et al topped the Onondaga lime 200 ft. high at 5,319 ft. in the test on Cora E. Lewis farm. Surface elevation of 1,995 ft. gives the Onandaga datum at —3,324 ft. compared with —3,524 ft. in 3 Sisler, the good chert gas well. The Lewis test topped the chert at 5,351 ft. where it was shut down to run casing which will be cemented.

In Greenbrier district, Summers County, the wildcat of Godfrey L. Cabot, Inc., on W. M. Elswick farm is shut down at 5,584 ft. to run 7-in. casing. It has not reached the Corniferous chert but ran casing after a bad fishing job.

In McKim district, Pleasants County, Fox Oil & Gas Co. completed the test Cassie Pifer in the Injun sand good for 786,000 cu. ft. gas, total depth 2,100 ft. In this district, Dinsmoor & Co. completed 8 Ralph Robey with a final gage of 1,000,000 cu. ft. gas from the Maxton sand, total depth 1,483 ft.

New locations in West Virginia totaled 10, located in Boone, Calhoun, Lincoln, Marion, Mingo, Ritchie, and Roane counties.

In Green Township, Erie County, northwest Pennsylvania, Appalachian Development Corp. drilled the wildcat on E. M. Downing through the Oriskany sand at 2,563-76 ft. and except for a showing of oil at 2,575 ft., it was dry. The total depth was 2,580 ft.

New locations in southwest Pennsylvania totaled four, located two each in Armstrong and Washington counties.

# MICHIGAN

## Operators Have Active Week

SAGINAW.—Getting producers in eight counties, Michigan oil operators for the week reported 11 new wells for combined initial daily potential of 1,700 bbl. Best well rated 35 bbl. an hour in Allegan County. While 21 new locations were announced, oil and gas completions in the state totaled 24, including six gas wells and seven dry holes. Four of the failures were wildcats.

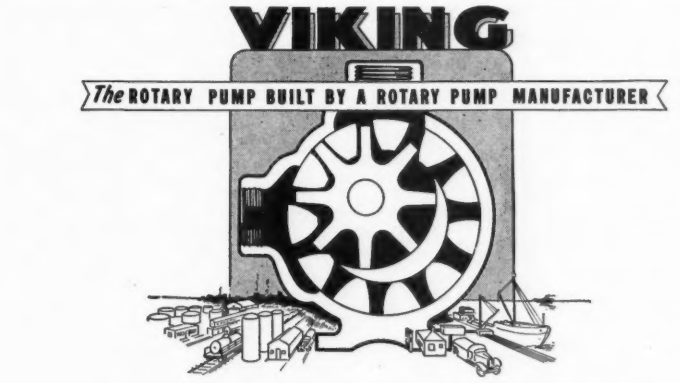
**MICHIGAN WILDCAT FAILURES**

Kent County, Sparta Township: Clarence Crawford 1 A. Hanna-Sparta Village, E½ E½ NE 36-9n-12, dry in Traverse, TD 2,279 ft.

Ogemaw County, Edwards Township: Basin Oil Co. 1 Trobaugh, SE SE SW 14-21n-1e, dry in Dundee, TD 3,465 ft.

Ottawa County, Crockery Township: Muskegon Development Co. 1 Taylor et al, NW NW NE 36-8n-15w, dry in Traverse, TD 1,771 ft.

Robinson Township: Rex Oil & Gas Co. 7 Vogt, NE NE SW 5-7n-15w, dry in Traverse, TD 1,708 ft.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# ROCKY MOUNTAIN

## Utah Land Reopened For Oil Leasing

DENVER.—The action of the Secretary of the Interior in restoring to entry for mineral leases of approximately 200,000 acres of the public domain in Grand and San Juan counties, Utah, opens some interesting territory for prospecting. The land was withdrawn during the war as potash and magnesium reserves following the drilling of an exploratory well near Thompson.

It was drilled to a total depth of 4,207 ft., and had showing of oil at the bottom of the hole. It had the Dakota at 1,770-1,807 ft. with a show of oil and gas in hard sand at 1,775-81 ft. The sand, however, lacked sufficient porosity to make it productive. It had shows of both oil and gas in the upper 12 ft. of a sand in the lower Morrison at 1,935-2,019 ft., and strong odors of oil and gas at 3,103-116 ft. The best shows, however, were in the Pennsylvanian from 4,178 ft. to the bottom at 4,207 ft.

The well was shut in with 10.8-lb. mud used in coring. It built up pressure of 500 psi. at the top of the casing above the mud and bled several times through the valves. Several barrels of light oil running about 45° gravity were recovered. The Bureau of Mines supervised efforts to make a test of the oil the following year, but after having stood so long with heavy mud on the sands, this did not prove satisfactory.

The effective date of the order restoring the withdrawn land to entry is July 23, 1947. At that time the land becomes subject to preference-right application. Non-preference filings will be opened October 23. Pending applications made prior to the withdrawal will be reinstated upon petition by the original applicant.

**Rangely allowable.**—Operators in the Rangely field went back to the old way of prorating production on June 1, on which date the allowable was established for the present at 153 bbl. per well per day. There were 223 wells on production from the Weber sand on that date. The allowable probably will be increased as soon as Utah Oil Refining Co. pumping station at Sunbeam, on its Rangely-Wamsutter line is in operation, which will be within a few weeks. This is expected to increase pipe line capacity from 26,000 to 35,000 bbl. per day.

**Black Mesa test abandoned.**—Pure Oil Co. 2 Unit, NE SW NE 6-30n-37e, Black Mesa District, Union County, northeastern New Mexico, was abandoned at 3,564 ft., presumably in granite. It was located 1 mile east and 4 miles south of 1 Unit which was abandoned last March at 3,514 ft. in granite. Tops on the last-named well were released the past week and are as follows: Day Creek dolomite, 565; Blaine, 835; Cimarron anhydrite, 1,455; Mississippian, 2,682; Simpson, 2,978; Arbuckle, 3001; granite, 3,510 ft., elevation 4,373 ft. Tops on 2 United have not been released.

**Beaver Creek dual well.**—Stanolind Oil & Gas Co. went back into its 2 Unit, NW NW SW 11-33n-96w, Beaver Creek, Fremont County, Wyoming, and recompleted it as a dual well producing from the fifth Frontier and Lakota sands, with a combined initial production of 22,000,000 cu. ft. of gas per day.

**East Keith wildcat.**—Texas Co. 1 Colbry, C SW SW 13-36n-6e, East Keith Block, Liberty County, Montana, a test to the Cambrian, gaged 2,900,000 cu. ft. of gas per day in drill-stem test at 1,827-1,904 ft., and on a second test at 2,820-60 ft., open 1 hour, recovered 499,999 cu. ft. with flowing pressure of 150 psi., and shut in for 10 minutes, built pressure up to 1,275 psi. It is located 4 miles northeast of same company's 1 Cicon, a gas discovery in the top of the Madison in 1935, making 3,000,000 cu. ft. at total depth of 3,221 ft.

**Elk Basin deep test.**—Stanolind Oil & Gas Co., as unit operator, is preparing to deepen 95 Unit, NE NW SE 31-58n-99w, Elk Basin field, Wyoming, as a second test to the Madison. It formerly was known as Carter 4-B Henderson, and was completed in the Tensleep at 4,590 ft., total depth in 1945, for 1,736 bbl. initial, but shut in to conserve gas. Location is 3 miles southeast of 38-M Unit, the discovery in the Madison, completed last year for 234 bbl. from the lower section of the Madison after casing off 340 ft. of pay in the upper section.

**Worland Frontier test.**—Pure Oil Co. 1 Unit, C SW NW 21-48-92, Worland Dome, Washakie County, Wyoming, flowed 41 bbl. from the third Frontier after testing 110 bbl. of 60° gravity oil and 4,500,000 cu. ft. of gas in second Frontier.

**New operations.**—Twenty-seven new operations were reported, of which 9 were in Colorado, 7 in Wyoming, 9 in Montana, and 2 in Northwest New Mexico. Two wildcats are Cities Service Oil Co.-Transcal Petroleum Corp. 1 Government, SE SE NW 27-12n-96w, in East Powder Wash District, Moffatt County, 5 miles east of nearest oil well, to go to 5,500 ft., and W. D. Broadhead 1 Spaulding Brothers, SE NE 5-15s-94w, Black Canon District, Delta County.

**COLORADO WILDCAT FAILURES**

Chromo, Archuleta County: Sherwin & Coxbury 1 Faulk, C SE NW 28-33n-1e, TD 917 ft., flowed water from Dakota, plugged and abd. No saturation in Greenhorn lime.

Iliff, Huerfano County: Rainbow Drilling Co. 1 Cordova, C SE SW 14-22s-65w, TD 700 ft., completed in Morrison as water well. Greenhorn, 65; Dakota, 225 ft.

Rattlesnake Butte, Las Animas County: Skelly Oil Co. 1 Pressey, NW NW NW 24-26s-63w, TD 1,338 ft., plugged. Top Kiowa, 180; Lakota, 218; Morrison, 255; Exetor, 540; Doakum, 555; Permian, 610 ft.

**LEGAL**

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m., Eastern Daylight Saving Time, Wednesday, July 9, 1947, for hand described herein situated within the known geologic structure of the Kevin-Sunburst field, P.M., Montana. This land is offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (41 Stat. 437, 30 U.S.C. sec. 181), as amended, in the following parcels: Parcel No. 1, T. 34 N., R. 2 W., sec. 3, lot 4, SW¼ NW¼, NW¼SW¼, 120.12 acres. Parcel No. 2, T. 35 N., R. 2 W., sec. 19, SE¼SW¼, 40 acres. Parcel No. 3, T. 34 N., R. 3 W., sec. 1, E½SE¼, 80 acres. Total 240.12 acres. Bids must be submitted on each parcel separately, but if two or more parcels are awarded to the same bidder they may be included in a single lease. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil and 12½ per cent to 16 2/3 per cent for gas in accordance with Schedule B in the lease form. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., and each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank, or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42(b) and (c). The envelopes should be plainly marked, "Bid for Parcel No. , Kevin-Sunburst field, Montana. Not to be opened before 1 p.m., Eastern Daylight Saving Time, Wednesday, July 9, 1947." No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental at the rate of $1 per acre must be paid and a corporate surety bond in the sum of $1,000 must be furnished by a successful bidder prior to the issuance of a lease. A $5,000 corporate surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Fred W. Johnson, Director.

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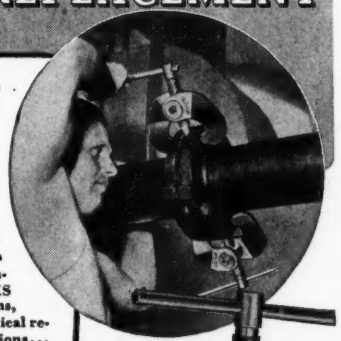

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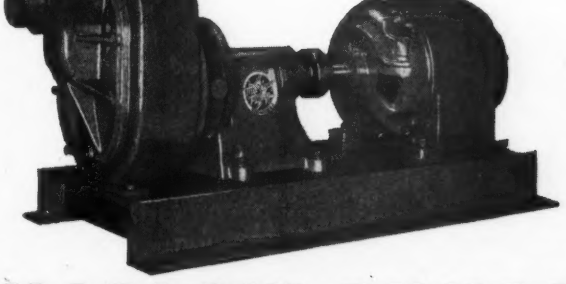

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Red Mesa, La Plata County: Hudson-Coryell 1 Schmidt, C NW NE 36-34n-12w, TD 3,459 ft., plugged. OWDD from 1,335 ft Niobrara, 3,050; Dakota, 3,295, show of oil; Morrison, 3,400 ft., no reliable test of Dakota show reported, tools lost in hole.

**WILDCAT FAILURE IN WYOMING**

South Byron, Big Horn County: Kirk Oil Co. 1 Prescott, SE SE SE 9-55n-96w, TD 7,218 ft., in Madison, water, plugged and abd. OWDD from 6,927 ft. Tensleep, 6,839; Amsden, 6,870 ft.

**WILDCAT FAILURE IN NORTHWESTERN NEW MEXICO**

Black Mesa, Union County: Pure Oil Co. 2 Unit, NE SW NE 6-30n-37e, TD 3,564 ft., plugged. Tops not released, presumably in granite.

## LA.-ARK.

### Union Parish Shallow Test Has Show

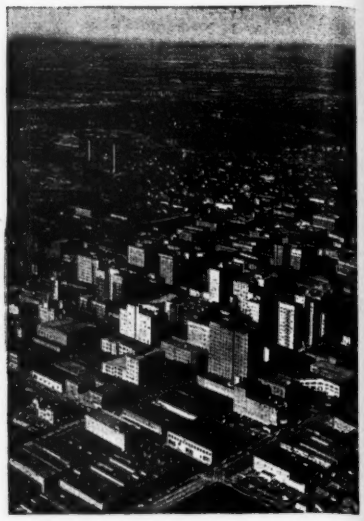
SHREVEPORT.—Feazel, Neely & Roberts 1 Dykes, in 24-22n-1w, in Union Parish, 7½ miles south of the old abandoned Oakland field, cored at 2,132-37 ft., recovering tight sand, and sand with oil stain and odor. Higher in the hole, between 2,129-32 ft. the recovery showed shale and limestone, and some tight sand being slightly porous with a faint gas odor.

In Sabine Parish, 6 miles west of Zwolle, in 31-8n-13w, H. H. Duck et al 1 Peavy-Wilson, was drilling below 3,977 ft. A drill-stem test at 3,487-95 ft., open 20 minutes, recovered 160 ft. of salt water and mud. The test was in the Washita Fredericksburg sand, topped at 3,478 ft. J. F. Lent 1 E. L. Whatley, Natchitoches test in 20-10n-10w, continued testing. Latest report showed 25 bbl. of oil and 25 bbl. of water recovered in swabbing and flowing in 8 hours. Operators were to install a pump. In 11-8n-8w, H. C. Cockburn 1 Long Leaf was drilling below 6,420 ft. Two miles northwest of the Lucky Gas field, Bienville Parish, N. B. Hunt 1 Nebo Oil Co., 33-16n-7w, was drilling below 6,947 ft. Top on the anhydrite stringer was 6,110 ft. In Caddo Parish, on the east edge of the Bethany gas field in 7-16n-16w, C. H. Murphy, Jr. 1 W. C. Agurs was drilling below 3,310 ft. Northeast of the town of Pleasant Hill, and 5 miles northeast of shallow production in the Pleasant Hill field, Hewitt & Daugherty 1 Cook Land Co., in 16-10n-11w, was running electric log at 6,152 ft.

In Lafayette County, Arkansas, McAlester Fuel Co. 1-A McDonald, 2 miles northwest of the McKamie field, in 23-17s-24w, had total depth at 4,868 ft. and was moving in heavier rig. Tops reported are the Nacatoch at 1,714 ft., Saratoga 2,121 ft., first Blossom sand 2,600-10 ft., Tokio 3,488 ft., Massive anhydrite 4,424-4,600 ft., and the Kilpatrick at 4,600-20 ft. The same operators' 1-A Texas Co.-Lee, south of the 1-A McDonald, in 24-17s-24w, perforated at 9,044-50 ft. and flowed 8 bbl. of distillate an hour through 9/64-in. tubing choke. The flow was accompanied by an estimated 1,500,000 cu. ft. of gas a day. Flowing tubing pressure was 2,100 psi., which rose to 2,450 psi. when shut in. Gravity of the oil has gone down from 56° to 48.8°. Operators believe this test opens a separate structure from McKamie since it is separated from production in the field by dry holes. It was shut in at 9,086 ft., total depth.

**NORTH LOUISIANA SUCCESSFUL WILDCAT**

Union Parish: New field, Ora—R. T. Sellers 1 Monzingo-Rivers Lumber Co., NW SE NE 23-22n-1w, flowed 8.5 bbl. 29.4°-gravity oil in 2 hours through ⅛-in. tubing choke from Nacatoch pay, TD



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3,490 ft., flowing tubing pressure 55 psi., GOR 246 cu. ft.

**NORTH LOUISIANA WILDCAT FAILURE**

Union Parish: C. H. Murphy, Jr. 1 Dergeron, NW SE 16-21n-1e, dry, TD 3,900 ft. No tops reported.

## OKLAHOMA

### Alfalfa County Test Making Oil

TOM RAY et al 1 Pelter, NE SE 21-25n-12w, Alfalfa County, was unofficially reported to be making 300 to 500 bbl. and 15,000,000 to 30,000,000 cu. ft. of gas per day from Mississippi chat between 6,100 and 6,165 ft. before hole bridged. Pipe was set at 6,121 ft., and hole was plugged back to 6,165 ft. from 7,238 ft. The well was treated with 5,000 gal. of acid. Hole is being cleaned out and tubing will be run for further testing.

Ned Biffle et al 1 Pharaoh, NW NW NW 15-3n-2w, Garvin County, flowed 10 bbl. 42°-gravity oil per hour for 10 hours, through perforations at 5,563-71 ft. in Deese formation, and after filling 500-bbl. tank was shut in for additional tankage. Gas flow was estimated at 500,000 cu. ft. per day. There is no water with the oil. This test, on a location drilled originally in 1934 and completed as a dry hole at 6,216 ft., is about 2 miles northeast of the Southwest Antioch pool.

Carter Oil Co. et al 1 J. D. Roady, SW NW 5-1n-1w, Garvin County, flowed 153 bbl. 40°-gravity oil in 16 hours through 10/64-in. choke. This is the south offset to the discovery well of the Katie pool.

Carter Oil Co. 1 Roady-Colley, SE NE 6-1n-1w, a southwest, diagonal offset to the Katie pool opener, showed estimated gas volume of 2,500,000 cu. ft. per day in 2 minutes and flowed oil at an estimated rate of 300 bbl. per hour in 10 minutes, on a drill-stem test at 6,150-81 ft. The recovery was 900 ft. of 40°-gravity oil. Drilling is being continued with tools below 6,276 ft.

Carter Oil Co. 1 Helvey, SE NW 25-2n-2w, Garvin County, drilled to 7,173 ft., has missed the Gibson sand and will be abandoned. This test has been of special interest as a possible link between the Katie and Northeast Elmore pools.

Sinclair Prairie 1 Harrison, NW NW 6-4n-3w, Garvin County, showed 25 bbl. oil per hour on drill-stem test at 9,814-73 ft., and at 9,909-39 ft. a second drill-stem test showed gas in 14 minutes estimated at 5,000,000 cu. ft. per day and oil flow estimated at 35 bbl. per hour. This is the east offset to the East Lindsay discovery well.

Pray and Bauman 1 Frankenburg, NW NE 7-4n-3w, a mile south and ½ mile east of the Sinclair Prairie 1 Harrison, is testing, and on 24-hour gage, flowed 1,216 bbl. oil through 9/64-in. choke.

**OKLAHOMA SUCCESSFUL WILDCAT**

Stephens County: Texas Co. 1 Denny, NE NE NE 1-2s-4w, IP 28 bbl., pay 6,798-6,820 ft. and 6,828-52 ft., TD 7,382 ft., PB 6,878 ft., Deese 2,365 ft., Springer 5,687 ft.

**OKLAHOMA WILDCAT FAILURES**

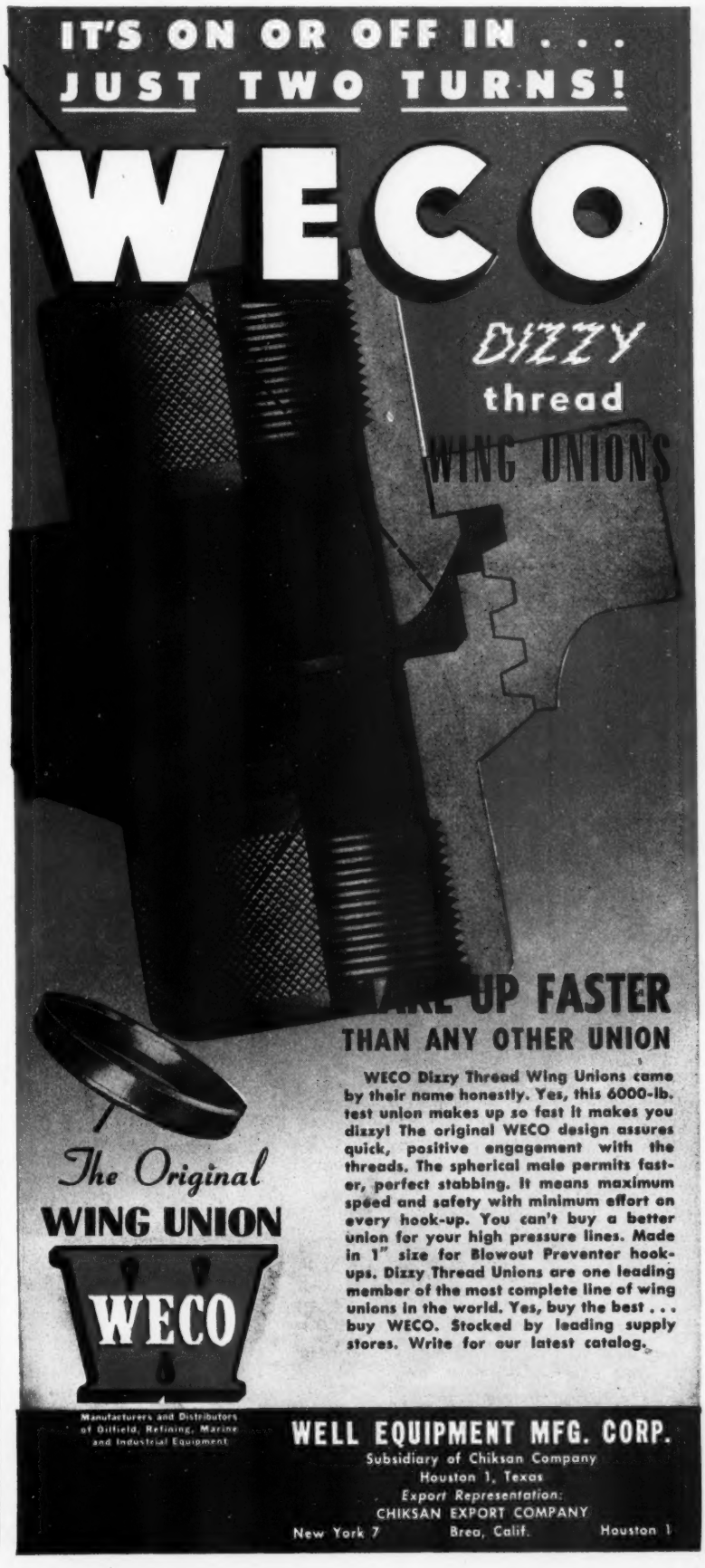
Atoka County: Blauner-Pierson 1 Blauner, NW NE NW 19-3s-11e, dry at 420 ft.

Carter County: Wirt Franklin 1 Thompson-Davis, NW SE 6-5s-2w, dry at 5,520 ft., Basal Pontotoc 1,410 ft., Deese 4,930 ft., Detrital zone 5,170 ft.

Cotton County: Taylor et al 1 Turner, SE SE NE 14-3s-12w, dry at 1,605 ft., no shows.

S. M. Andrews 1 Dykes, NE NW 15-3s-11w, dry at 1,810 ft., no shows.

Joe Moore et al 1 Lindsay, NE NW 7-4s-11w, dry at 2,037 ft., no shows.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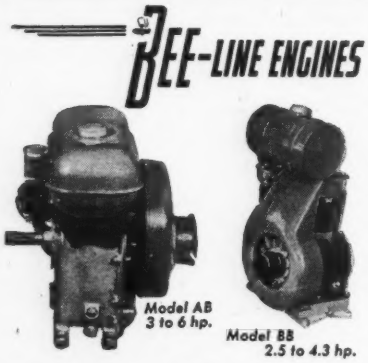


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*635 W. Colorado Blvd., Glendale 4, Calif.*


L. H. Choate 1 Jamison, SW SW SW 1-4s-10w, dry at 1,551 ft.

Frank Harvey 1 Williams, SW SW SE 4-5s-12w, dry at 1,805 ft.

Hughes County: Kingery-Patterson et al 1 Bilby, SW SW SW 4-6n-9e, dry at 2,900 ft., Allen 1,095 ft., Booch 2,718 ft.

Jackson County: P. P. Langford 1 Hickman, NE SE 3-1n-19w, dry at 1,932 ft., granite 1,925 ft.

Lincoln County: Davon Oil Co. 1 Frizzell, SE NW SW 28-13n-2e, dry at 5,183 ft., Checkerboard 4,090 ft., Cleveland 4,114 ft., Oswego 4,692 ft., Bartlesville 4,983 ft.

Blackwell Oil & Gas Co. 1 Carter, SE SE NW 26-17n-5e, dry at 3,485 ft., Mississippi 3,654 ft., Viola 3,952 ft., Wilcox 3,998 ft.

Roy L. Kemp 1 Black, SE SE NW 27-17n-6e, dry at 1,760 ft., Layton 1,732 ft.

Love County: Samedan Oil Co. 1 Brown, NW SW NE 18-6s-2e, dry at 2,608 ft., sand 2,427-51 ft., sand 2,520-40 ft.

Pontotoc County: Foron-Nowels et al 1 Smith, SE SW NW 29-4n-8e, dry at 520 ft.

Tillman County: Texas Co. 1 Bruster, SE NW SE 15-2s-15w, dry at 3,436 ft., Cisco 1,660 ft., Canyon 1,942 ft., Arbuckle 2,998 ft.

George Deck 1 Gibbs, NW NW NE 5-3s-18w, dry at 3,250 ft., missed Canyon, no shows.

## OHIO, KENTUCKY

### Sego Oil Area Gets Another Good Well

COLUMBUS.—Another big oil well in the Sego area in Madison Township, Perry County, was completed this week. B. G. Bartley et al 1 Elmer A. Moore, Section 22, was drilled in with good showings of both oil and gas. After shooting with 60 quarts, the well made 110 bbl. in the first 24 hours. Forty-one feet of sand was reported at 3,270-3,311 ft.

John Morrow et al 1 Chas. A. Crosson, Section 27, Madison Township, had water break through the casing after shot, and the initial rating of the well is not known. The operator reported that the well flowed 10 bbl. immediately after shot, and that an additional 55 bbl. was swabbed out 40 hours later. The well made 717,000 cu. ft. natural with a good show of oil.

Northeast of Somerset in Reading Township, B. G. Davis et al completed their 1 Frank Dittoe, Section 3. Clinton sand was found at 3,031-66 ft., and flowed 40 bbl. the first day after shot.

Three tests, east, south and southeast of the Hemlock Grove pool, all in Chester Township, Meigs County, have been started in an endeavor to extend the pool or find new pools in the Berea sand. Piersol et al have made a location on Henry Mora, Section 34; Spencer et al have located on W. B. Bailey in Section 26; and on Emma Caleton in Section 4.

New operations reported were up to 21 this week compared to 18 last week. Hocking and Monroe counties reported three each, and Muskingum County two. Twenty-two wells were completed with Sandyville leading with six, five of which were in Canton.

#### INDIANA

EVANSVILLE.—Ralph Halbert et al 1 Ayrshire Collieries, SW SE SW 30-2s-7w, Pike County, flowed 65 bbl. oil per hour for 5 hours from McClosky at 1,403-09 ft., when plug was drilled. This test is about 2 miles southeast of the Oakland pool.

#### WESTERN KENTUCKY

OWENSBORO.—F. H. Venerier 1 Craig, 15-I-32, Muhlenberg County, about 1 mile southwest of production in the Rochester pool, has Viola at 1,055 ft., Glen Dean at 1,107 ft., and is now drilling below 1,193 ft.

C. Wood 1 W. A. Sauer, 16-Q-22, Henderson County, located about 4 miles north-

#### LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that sealed bids will be received until 1 p.m., Eastern Daylight Saving Time, Wednesday, July 16, 1947 for lands described herein situated within the known geologic structure of the Hugoton gas field, 6th P. M., Kansas, and C. M., Oklahoma. These lands are offered to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act of February 25, 1920 (41 Stat., 437, 30 U.S.C., sec. 181), as amended, in the following parcels: Holcomb area, Hugoton field, Kansas: Parcel No. 1, T. 24 S., R. 33 W., sec. 18, lot 4, 35.72 acres, Parcel No. 2, T. 26 S., R. 33 W., sec. 5, lots 2, 3, 201.33 acres. Parcel No. 3, T. 27 S., R. 33 W., sec. 8, S½, 320 acres. Parcel No. 4, T. 27 S., R. 34 W., sec. 12, S½, 320 acres. Hugoton field, Kansas: Parcel No. 5, T. 31 S., R. 34 W., sec. 21, NE¼NW¼, 40 acres. Parcel No. 6, T. 32 S., R. 33 W., sec. 19, lot 3, 37.53 acres. Hugoton gas field, Oklahoma: Parcel No. 7, T. 2 N., R. 18 E., sec. 4, SW¼SE¼, 40 acres. Parcel No. 8, T. 2 N., R. 18 E., sec. 18, lot 1, NE¼NW¼, 80.11 acres. Parcel No. 9, T. 3 N., R. 18 E., sec. 31, SE¼SE¼, 40 acres. Parcel No. 10, T. 1 S., R. 12 E., fractional secs. 1 to 6 inclusive, 339.01 acres. Parcel No. 11, T. 1 S., R. 13 E., fractional secs. 1 to 6 inclusive, 320.44 acres. Parcel No. 12, T. 1 S., R. 14 E., fractional secs. 1 to 6 inclusive, 301.87 acres. Parcel No. 13, T. 1 S., R. 15 E., fractional secs. 1 to 6 inclusive, 294.11 acres. Parcel No. 14, T. 1 S., R. 16 E., fractional secs. 1 to 6 inclusive, 250.15 acres. Parcel No. 15, T. 1 S., R. 17 E., fractional secs. 1 to 6 inclusive, 191.38 acres. Total 2811.65 acres. Annual rental will be at the rate of 25 cents per acre so long as the land is valuable only for gas; but upon discovery of a valuable deposit of oil within the boundaries of the known structure on which all or a part of these lands are situated, rental will be not less than $1.00 per acre. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Bids must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., and each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank, or by money order, made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease, required under 43 CFR 192.42(b) and (c). The envelopes should be plainly marked "Bid for Parcel No. ...., Hugoton gas field, Kansas and Oklahoma. Not to be opened before 1 p.m., Eastern Daylight Saving Time, Wednesday, July 16, 1947." No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental at the rate of 25 cents per acre must be paid, and a corporate surety bond in the sum of at least double the amount of rental but in no case less than $1,000 nor more than $5,000 must be furnished by a successful bidder prior to the issuance of a lease. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. The lands in Parcels Nos. 10 to 15 inclusive are subject to the act of August 7, 1946 (Public Law 617, 79th Congress), and any person believing or claiming to have a preference right under section 20 of the mineral leasing act as amended (43 CFR 192.70) for any of these lands must file his application for preference right lease with the Director, Bureau of Land Management, Washington 25, D. C., on or prior to the date herein set for the opening of bids. No particular form of application is required, but it should follow the instructions set out in 43 CFR 192.42, and reference should be made to this notice of offer for lease. The application must be accompanied by a filing fee of $10, together with one-half of the first year's rental at the rate of 25 cents per acre or fraction thereof. No preference right claim will be considered unless filed in accordance herewith. Fred W. Johnson, Director.

west of the Dixie pool, had Viola at 1,842 ft., Barlow at 2,214 ft., Cypress at 2,240 ft., and is now drilling below 2,385 ft. This test is located about 4 miles northwest of the Dixie pool.

**EASTERN KENTUCKY ACTIVITIES**

ASHLAND.—Kentuck West Virginia Gas Co. completed two wells during the week, No. 5,742 on the L. D. Hinkle et al property, Martin County, at 705 ft. with 700,000 cu. ft. in Salt sand, and No. 845, J. W. Maynard property, Pike County, 2,200 ft., with 76,000 cu. ft. in shale, A.S.

Locations were noted at 5,746, M. B. Goble, Martin; 5,747, B. F. Gilliam, Pike; 5,749, Wilson Damron, Pike, and 5,750, George H. Ray, Pike.

# KANSAS

## New Pool Opened In Rush County

GREAT LAKES CARBON et al 1 Dirks, SW SW SE 16-18s-18w, Rush County, swabbed 28 bbl. oil per day from Arbuckle lime when plug was drilled. Pipe was set at 3,838 ft., or 2 ft. in the Arbuckle and cement was drilled out to 3,861 ft., 4 ft. above the original total depth. This test is a rank wildcat about 12 miles west of the Otis gas field.

Aladdin Petroleum Corp. 1 Dugan, NW NW SE 7-28s-1w, Sedgwick County, on drill-stem test in Mississippi lime at 3,338-83 ft. had gas in 3 minutes estimated at 3,690,000 cu. ft. per day and 150 ft. of clean oil, free of water. Drill-stem test in Simpson at 3,660-63 ft. had gas in 9 minutes and recovered 2,200 ft. of oil, free of water. Well flowed when tools were pulled from the hole. Pipe has been set on top of Simpson at 3,659 ft. This test is ¾ miles south of the abandoned Schulte pool, which was discovered in 1934 and produced from the Wilcox sand.

Darby and Bothwell 1 Schermer, NE NE NW 4-12s-18w, Ellis County, has pipe set at 3,581 ft. to test shows in Lansing, topped at 3,337 ft. Drill-stem test 37 to 59 ft. in Lansing recovered 95 ft. of oil-cut mud, and a second test at 97 to 114 ft. in Lansing, recovered 30 ft. of oil and gas-cut mud and 60 ft. of muddy oil. The well was drilled to 3,661 ft. Base of Kansas City was logged at 3,579 ft., top of Conglomerate was logged at 3,674 ft., top of Simpson at 3,638 ft., and top of Arbuckle at 3,346 ft.

Brunson and Adair 1 Howard NW NW SE 15-22s-13w, Stafford County, has pipe set to test Arbuckle which was topped at 3,797 ft. Total depth is 3,803 ft. Drill-stem test in Lansing at 3,514-25 ft. recovered 350 ft. of oil-cut mud and saturation was logged at 3,581-88 ft.

**KANSAS SUCCESSFUL WILDCAT**

Cowley County: Nadel and Gussman 1 Weigle, NE NE NE 18-31s-6e, 17 bbl. oil in 17 hours from Bartlesville, shot 60 qt. 2,845-88 ft., TD 2,891 ft., Lansing 2,195 ft., Bartlesville 2,835 ft.

**KANSAS WILDCAT FAILURES**

Barton County: Sohio Oil Co. et al 1 Horejsi, NW NW NW 12-16s-11w, dry 3,362 ft., Lansing 3,010 ft., conglomerate 3,327 ft., Arbuckle 3,340 ft.

Ellis County: Alkay Oil Co. 1 Slimmer, NW SE 2-11s-17w, dry at 3,250 ft., Lansing 3,064 ft.

Dozier-Bradley et al, NW NE SW 20-12s-20w, dry at 3,950 ft., Lansing 3,541 ft., Arbuckle 3,910 ft.

Morris County: Brazil and Newton 1 Wiggins, SW NW SE 18-16s-6e, dry at 2,511 ft., Misener 2,450 ft., Hunton 2,452 ft.

Rooks County: Bird and Boering et al 1 Talley, SE SE NW 18-8s-19w, dry at 3,516 ft., Heebner 3,152 ft., Lansing 3,173 ft., Arbuckle 3,465 ft.

Rush County: Brack and Apex 1 Hagerman, NW NW NW 22-19s-16w, dry at


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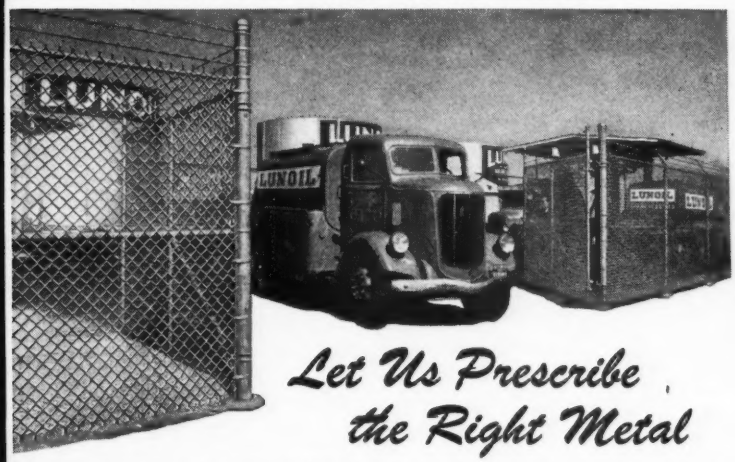


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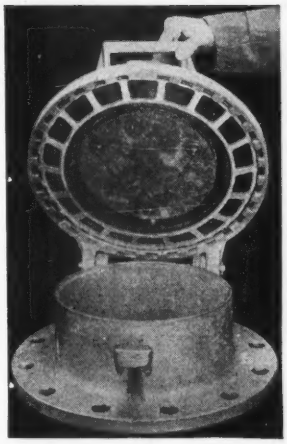

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4,065 ft., Lansing 3,452 ft., conglomerate 3,757 ft., Arbuckle 3,884 ft.

Russell County: Jones and Shelburne 1 Buhler, NE NE SW 26-15s-12w, dry at 3,362 ft., Lansing 3,010 ft., conglomerate 3,312 ft., Arbuckle 3,337 ft.

## SOUTHWEST TEXAS

### Another New Pay for South Haldeman Area

CORPUS CHRISTI.—Sunray Oil Corp. 1-C C. T. Hewitt, discovery well of a new pay zone approximately 1,475 ft. southwest of the "South Haldeman" field discovery, in Jim Wells County, flowed potential gage of 216 bbl. of clean 45.7°-gravity oil per day through an 11/64-in. choke, through perforations at 5,150-55 ft. Tubing pressure was 840 psi. and casing pressure 1,200 psi., gas-oil ratio 912 cu. ft.

Total depth is 6,006 ft., with 5½-in. casing set to 5,236 ft. Top of the pay zone is 5,135 ft. This test is located in Section 51 of R. P. Haldeman Subdivision. The discovery well was completed at the 4,500-ft. level, and the second well in the field, 1,320 ft. north of the discovery, was completed at the 5,570-ft. level. The 1-C Hewitt is the third for the field. Operators are now rigging up their 1-D Hewitt, 660 ft. west of the 1-C well, as the field's fourth test.

A new oil pool has been opened in Caldwell County, 6 miles south of Lockhart, by W. Killam 2 Andrew J. Rodenberg. This well was completed for an initial production of 1,016 bbl. of oil and 110,000 cu. ft. of gas per day on open flow, with 110 psi. working pressure on the tubing, through open hole at 2,085-2,173 ft. in the Austin chalk, topped at 2,082 ft. The well logged a crevice in the chalk at 2,120 ft. Total depth is 2,173 ft., with 5½-in. casing at 2,085 ft. This new field is located in the Guadalupe College Survey, 2,600 ft. southwest of the southwest limits of Burdette Wells townsite. Location for 3 Rodenberg has been staked 935 ft. east-northeast of the 2 discovery.

A new gas pool has been opened in southwestern Hidalgo County, approximately 5 miles northwest of Samfordyce and 5 miles north-northeast of Sullivan City, near the Starr County line by The Texas Co. 1 J. M. Doss. Drilled to a total depth of 8,906 ft., this well flowed 4,175,000 cu. ft. of gas per day through a ⅛-in. choke, with 1,455 psi. tubing pressure, and 7,370,000 cu. ft. of gas per day through a ¼-in. choke, tubing pressure 1,345 psi., through perforations at 3,832-40 ft. Shut-in pressure was 1,520 psi.

Curtis Singleton and W. H. Wallace 1 Mantor & Briggs, new oil field discovery well in western Nueces County, approximately 4 miles northwest of Banquete, ran potential gage of 133 bbl. of clean 40.8°-gravity oil per day through a 5/32-in. choke, with gas-oil ratio of 5,180 cu. ft. Production is through perforations at 6,016-21 ft. in oil sand topped at 6,016 ft. Tubing pressure 1,875 psi. The well is dual-completed in an upper gas sand through the casing. Total depth is 6,687 ft. with 5½-in. casing on bottom.

The casing completion is through perforations at 4,950-61 ft., where drill-stem test open 1 hour flowed gas and condensate, with 1,700 psi. working pressure, through ¼-in. top and bottom chokes. Shut-in pressure is 1,850 psi. This new discovery is located in Block 16 of Briggs & Kuykendall Subdivision, about 2 miles northwest of Agua Dulce field, and 3 miles northeast of Richard King field.

Also in Nueces County, 2 miles northwest of Bishop, H. R. Smith and W. C. McBride, Inc. 1 Kaiser has opened a new oil pool in the F. Z. Bishop Palo Alto Subdivision. On potential gage it flowed 176 bbl. of clean 46°-gravity oil per day through a 7/64-in. choke, with 1,350 psi. tubing pressure and 1,500 psi. casing pressure. Gas-oil ratio 960 cu. ft. Total flow is 7,136 ft., and production is through perforations at 7,133-35 ft.

The Santa Clara Oil Co. and John F. Camp & Sons at their 1-C James F. Welder Heirs, a prospective new oil discovery in northeastern Duval County, approximately 3 miles south of the Strake field in J. Poitevent Survey 221, have set casing and are waiting on cement. Drill-stem test at 3,273-77 ft., open 14 minutes, developed 32 psi. working pressure and recovered 2,200 ft. of pipe-line oil.

Skinner & Eddy Corp & Newman Brothers 1-B South Texas Syndicate, a wildcat 2 miles southwest of the Greens Branch field, McMullen County, in E. M. Beal Survey 28, showed oil in the Queen City zone sand. A drill-stem test at 2,286-93 ft., using ¼-in. choke, recovered 100 ft. of oil, 2,500 ft. oil-cut mud, no water. Tool was open 1 hour and showed 840 psi. shut-in pressure. Mud weight was 1,000 lb. Total depth is 2,293 ft., and the 5½-in. production casing has been set to 2,286 ft.

The 42 new locations reported this week included 14 wildcat starts, 2 each in Atascosa, Nueces, and San Patricio, and 1 each in Bastrop, Bexar, Brooks, Caldwell, Dimmit, Duval, Starr, and Zapata counties.

#### SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Caldwell County: New oil pool, New Burdette Wells—W. Killiam 2 Andrew J. Rodenberg, in Guadalupe College Sur., in old Burdette Wells area, 6 mi. S of Lockhart, top pay 2,082 ft., Austin chalk, TD 2,173 ft. (crevice at 2,120 ft.), open hole 2,085-2,173 ft., IP: 1,015 bbl. oil per day on open flow, and 110,000 cu. ft. gas per day, TP 110 psi., casing sealed, no water.

Hidalgo County: New gas pool—The Texas Co. 1 J. M. Doss, in Xavier Zamora

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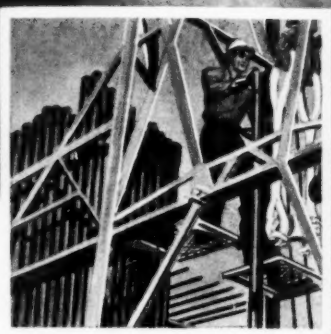

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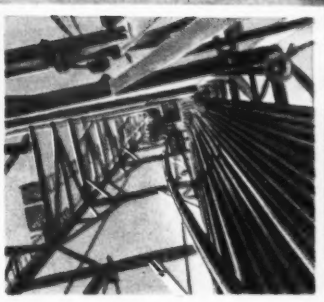

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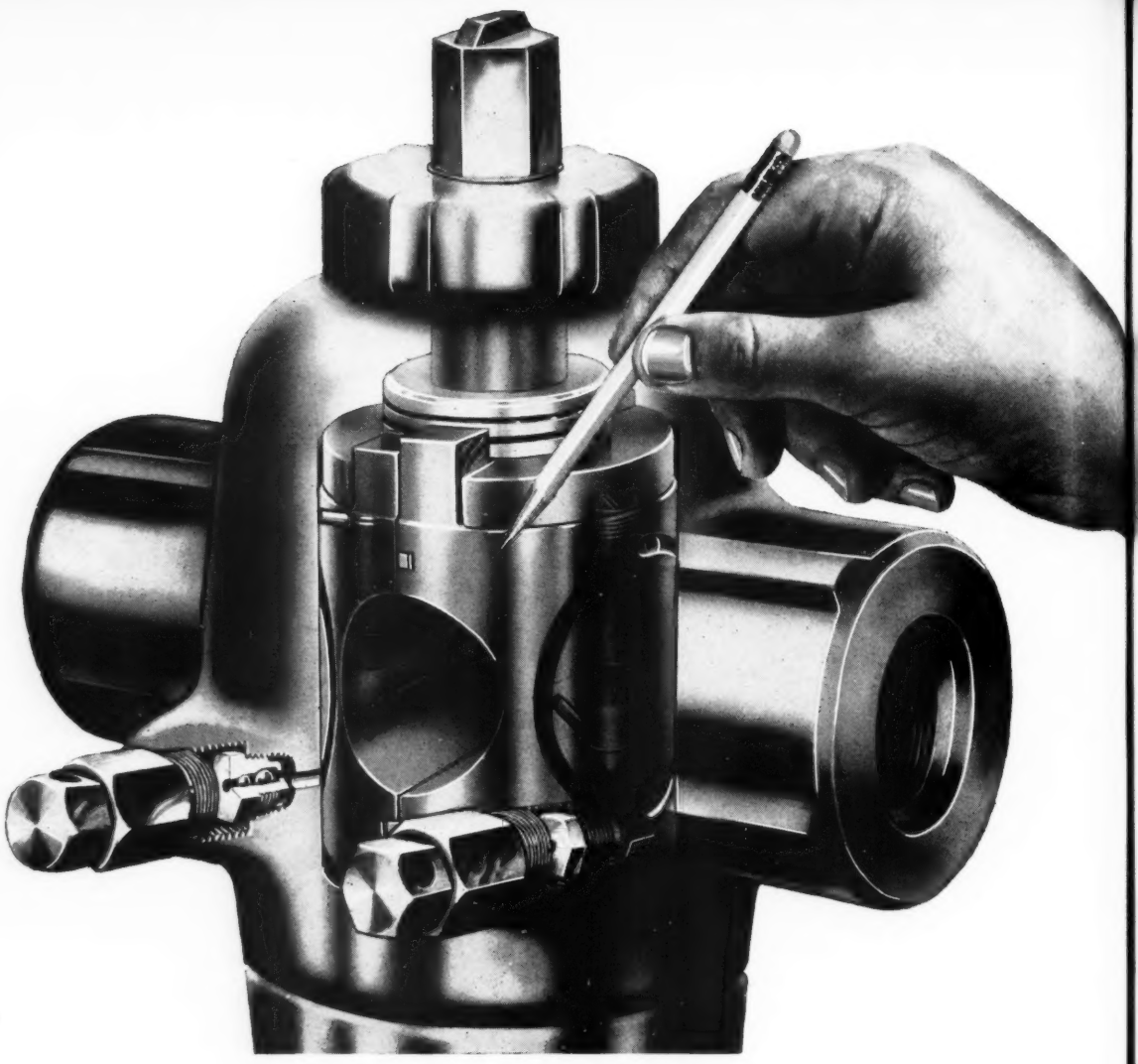

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Porcion 41, 5 mi. NE of Sullivan City, near Starr County line, 5 mi. NW of Samfordyce, top pay 3,832 ft., TD 8,906 ft., perf. 3,832-40 ft., IP: 18,000,000 cu. ft. gas per day, on open flow (dry gas). On ⅛-in. choke flowed 4,175,000 cu. ft. gas per day. TP 1,455 psi., SIP 1,520 psi., no water.

Nueces County: New oil and gas pool—Curtis Singleton and W. H. Wallace 1 H. C. Mantor and R. C. Briggs, in Briggs & Kuykendall Subd., 4 mi. NW of Banquette, in Casa Blanca Grant, 2 mi. NW of Agua Dulce field and 3 mi. NE of Richard King field, dual completion: Top pay 4,950 ft., TD 6,687 ft., perf. 4,950-61 ft., IP: gas-condensate, no gage. Top pay 6,016 ft., perf. 6,016-21 ft., IP: 133 bbl. oil per day through 5/32-in. choke, gas-oil ratio 5,180, gravity 40.8°, no water.

New gas-condensate pay, North King: Rand Morgan 1-B fee in S. A. de Agua Dulce Grant, 8 mi. N of Agua Dulce, dual completion: Top pay 4,978 ft. (new sand), TD 5,185 ft., perf. 4,978-88 ft., IP: 1,235,000 cu. ft. gas per day through 3/16-in. choke, 1,535 psi., WP, or 2,205,000 cu. ft. gas per day through ¼-in. choke, CP 1,495 lb., with condensate, no water. Top pay 5,140 ft., perf. 5,145-52 ft., IP: 1,650,000 cu. ft. gas PD through 3/16-in. choke, 2,010 psi. WP, or 2,790,000 cu. ft. gas PD through ¼-in. choke, 1,890 psi., WP, with condensate, no water.

**SOUTHWEST TEXAS WILDCAT FAILURES**

Bastrop County: R. C. Clark 1 Bessie Richardson Lytton, 2 mi. NW of Cedar Creek, in J. A. Navarro Sur., dry, TD 2,122 ft. in Austin chalk.

Duval County: Atlantic Refg. Co. 1 J. R. Foster, in J. R. Foster Sur. 270, 10 mi. N of Freer, dry, TD 9,349 ft.

Bridwell Oil Co. and Chapman Oil Co. of Texas and H. L. Wadsworth 1 Rodolfo P. Garcia et al, in San Diego de Arriba Grant, 10 mi. N of San Diego, dry, TD 5,056 ft.

Hidalgo County: J. O. Clark, Jr. 1 Bemis L. Daskam et al, Lot 26, Porcion 45, B. H. King Subd., 5½ mi. NE of Sullivan City, dry, TD 5,105 ft.

San Patricio County: Humphries & Hotchkin 1 A. N. Smith, in T. T. Williamson Sur., 2 mi. SE of Odem, dry, TD 6,502 ft.

A. O. Morgan and J. C. Wynne 1 B. H. Owens, Blk. 13, Welder & Coleman-Fulton Pasture Co., Subd. of George Morris Sur., 3½ mi. W of Sinton, dry, TD 7,016 ft.

Starr County: Starr Oil Co. 1 Domingo L. Garza, Share 65, Porcion 80, 10 mi. N of Rio Grande City, 1 mi. NW of Edgerton field, dry, TD 4,259 ft.

Humble 1 E. G. Gonzales, in TTRR Sur. 373, 9½ mi. SE of Cuevitas and 6 mi. SE of Guerra field, dry, TD 5,514 ft.

Travis County: E. R. Marts 2 Van Harris, in William Hines Sur., dry, TD 1,954 ft. in Edwards lime.

Zapata County: Government Wells Oil Co., Inc. 1 Virginia Garcia, in Corralitos Subd., J. V. Borrego Grant, dry, TD 936 ft.

# CALIFORNIA

## Pyramid Hills Test Looks Good

LOS ANGELES.—The Cal Valley Oil Co. appears to have a new oil discovery in the Pyramid Hills area of Kings County at their well No. 13, 17-24s-18e. This well was originally drilled to a total depth of 1,885 ft. where it went into a fault and subsequently was plugged back to 1,300 ft. Last week operators drilled out the plug and gun perforated from 1,060-1,185 ft. with 6 holes per ft. Immediately afterwards, the well produced all clean oil on a swabbing test and showed approximately 60 lb. casing-head pressure. Operators then went back into the hole and perforated at a depth of 690-710 ft., and are now resuming and swabbing tests to determine if the production has been increased. Although no production estimates have been released, it is believed that the well will make a substantial producer when completed. Location of the prospective discovery is approximately 1 mile north of 4 producing wells owned by the Standard Oil Co. of California.

The Maricopa Flat area of the Midway-Sunset field, which underwent a flurry of drilling nearly 20 years ago, may once again undergo an active drilling campaign as the result of a well now being tested in 32-12n-23w by the General Petroleum Corp. This well, the 4 Pacific, last week produced at the rate of 400 bbl. in 6 hours on a formation test at 3,845-3,925 ft., and at a rate of 243 bbl. in 3 hours on a formation test at 3,919-75 ft. Gravity of the crude was approximately 28°, and water cut was 0.1 per cent. The first formation test was made through a 6/64-in. choke and the latter through a 24/64-in. choke. Following the formation tests, 534 ft. of 6⅝-in. liner, including perforations at 3,843-3,974 ft., was landed at 3,975 ft. and coupled at 3,840 ft. The splice, however, tested wet and the well is now standing squeezed.

The primary drilling in this area was kicked off when the Obisbo Oil Co. got a good well in a shallow zone lying just above the Brown shale. This zone is now known as the Obispo Zone. During the excitement of drilling, General Petroleum obtained a lease from Midway Pacific and drilled about a dozen shallow producers, all of which missed the Obispo zone. A few months ago, General Petroleum re-entered the area and drilled a deeper hole which was completed as a 100-bbl. pumper. The next well, the 4 Pacific, was carried on beyond the Obispo zone, topped at 3,850 ft., and is now bottomed at 3,975 ft.

The Marine Exploration Co., which represents combined interests of the Jergins Co. and the Texas Co., recently has sought permission to drill three test wells in the tidelands near the southern limit of Seal Beach. Tentative plans adopted by the company call for the construction of an island approximately 8,000 ft. from the shoreline to be used as a site for drilling equipment. The island would consist of a fill 75 ft. in diameter, and plans indicate it would be surrounded by sheet steel piling with wharfage connected to the lee side. Marine Exploration is presently preparing to re-drill the 1 State, 11-5s-12w, which is in the same area as the proposed tests. The 1 State, however, is located on the shore and will be whipstocked out into the tidelands if possible.

Honolulu Oil Co.'s prospective discovery in the Goleta area of Santa Barbara County, the 309-1 State, 19-4n-28w, has been plugged back to a depth of 700 ft. and will be re-drilled. A directionally drilled well, the 309-1 State, originally went to a depth of 3,962 ft. where it showed promise of opening a new oil field.

New locations announced during the past week totaled 46, an increase of 8 over the previous week. The new locations were fairly evenly distributed throughout the various fields, with the Huntington Beach, Cymric and Coalinga fields heading the list by each receiving three of the proposed new tests.

**CALIFORNIA SUCCESSFUL WILDCAT**

Kern County, Elk Hills Area: Standard Oil Co., Operator 42-33R U.O.N.P.R., 33-30s-23e, pumped 42 bbl. 34°-gravity crude per day, 11 per cent cut, elev. 1,368 ft., TD 3,320 ft.

**CALIFORNIA WILDCAT FAILURES**

Kern County, Carneros Creek Area: Independent Exploration Co. 1 Anderson, 29-28s-20e, elev. 1,114 ft., Carneros 2,295 ft., dry, TD 2,636 ft.

Cymric Area: Independent Exploration Co. 66-17 Bowles, 17-29s-21e, dry, elev.


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Edison Area: Caliente Oil Co. 1 Cohn Estate, 12-30s-29e, dry, elev. 732 ft., TD 3,471 ft.

McDonald Anticline Area: Honolulu Oil Corp. 2 Honolulu-Willshire,Layman, 18-28s-20e, dry, elev. 1,000 ft., Miocene 588 ft., Gould Shale 623 ft., Button Bed 1,125 ft., Upper Santos 1,199 ft., Phacoides 1,928 ft., Kreyenhagen shale 1,960 ft., Kreyenhagen sand 2,054 ft., TD 2,090 ft.

McFarland Area: Shell Oil Co. 1 Guth McCaleb Comm., 12-26s-26e, dry, elev. 607 ft., TD 5,280 ft.

Sharktooth Area: Barnsdall Oil Co. 1 Southern Pacific, 25-28s-28e, dry, elev. 526 ft., Olcese 2,280 ft., Pyramid Hills 2,540 ft., Vedder 2,628 ft., TD 2,670 ft.

Los Angeles County, Dominguez Area: Union Oil Co. 58 Hellman, 27-3s-13w, elev. 112 ft., dry, TD 11,330 ft.

Montebello Area: Premier Petroleum Corp. 1 Carla, 8-2s-11w, dry, no shows reported, elev. 210 ft., TD 7,000 ft.

# ILLINOIS

## New McClosky Pool Opener Between Two Old Fields

MATTOON.—R. B. Martin-Illinois Oil Co. 1 Higgins, NW NW NW 36-2n-14w, Wabash County, pumped and flowed 134 bbl. oil in 12 hours from McClosky at 2,898-2,900 ft., after being treated with 1,500 gal. acid. Total depth is 2,900 ft. This completion opens new pool about midway between the Parkersburg Consolidated and the Lancaster pools.

Fleming-Swann et al 1 Mason, SE SE SE 10-4s-7e, Hamilton County, swabbed 151 bbl. oil and 6 bbl. water while cleaning out to test Aux Vases logged at 3,257 ft. Total depth is 3,267 ft.

Leo V. Horton 1 Kokorudz, SW SE NE 21-6n-2w, Bond County, recovered 82 ft. mud-cut oil on drill-stem test in the Trenton at 3,151-67 ft. Total depth is 3,167 ft. Pipe is set at 3,152 ft., 1 ft. in the Trenton. Glen Dean was logged at 714 ft., Ste. Genevieve at 1,072 ft., and Devonian at 2,263 ft.

### ILLINOIS WILDCAT FAILURES

Clay County: C. E. Brehm 1 Smith, SE NE SE 14-4n-5e, dry at 2,738 ft., Glen Dean 2,151 ft., Cypress 2,332 ft., Aux Vases 2,594 ft., McClosky 2,677 ft.

Nash Redwine 1 Drefford, SE NE SE 32-3n-7e, dry at 3,096 ft., Ste. Genevieve 3,016 ft., Rosiclare 3,036 ft., McClosky 3,078 ft.

Clinton County: C. R. Winn 1 Hemminghouse, NE NW NE 1-2n-1w, dry at 1,365 ft., junked hole.

J. D. Finley 1 Conrad, SW SW NE 33-3n-1w, dry at 1,416 ft., Glen Dean 1,062 ft., Cypress 1,248 ft., Benoist 1,380 ft.

Cumberland County: A. J. Slagter 1 Liggett, SW SE SE 27-9n-9e, dry at 2,805 ft., Glen Dean 2,215 ft., Cypress 2,377 ft., Ste. Genevieve 2,625 ft., McClosky 2,705 ft.

Edwards County: Calvert and Willis 1 Bennett Heirs, SE SE SE 29-1n-10e, dry at 3,408 ft., Glen Dean 2,692 ft., Benoist 3,084 ft., Aux Vases 3,222 ft., McClosky 3,220 ft.

Jasper County: Collins Brothers 1 Mitchell, SW SE SW 34-7n-8e, dry at 3,108 ft.

Shelby County: John Carlson 1 Nantz, NW SE NE 31-12n-2e, dry at 1,551 ft., Glen Dean 1,262 ft., Golconda 1,454 ft., Benoist 1,528 ft., McClosky 1,627 ft.

White County: S. C. Yingling 1 Stokes, NE SE NE 28-4s-10e, dry at 3,226 ft., Ste. Genevieve 3,071(?) ft., McClosky 3,110 ft.

F. J. Fleming-A. K. Swann et al Williams, SE SE NE 2-4s-9e, dry at 3,455 ft., Tarr Springs 2,715 ft., Cypress 3,140 ft., Ste. Genevieve 3,337 ft., Rosiclare 3,396 ft.

### ILLINOIS SUCCESSFUL WILDCATS

Clay County: National Associated Petroleum Co. 1 Spiker, SE SE SE 12-3n-5e, IP 20 bbl., from Aux Vases 2,792-2,800 ft., TD 2,803 ft., PB 2,800 ft.

Lawrence County: Fox and Fox 1 Bass, SE SE NW 11-2n-13w, IP 12 bbl., Waltersburg sand 1,776-86 ft., shot 20 qt. 1,776-85 ft., Menard 1,721 ft., TD 1,803 ft.

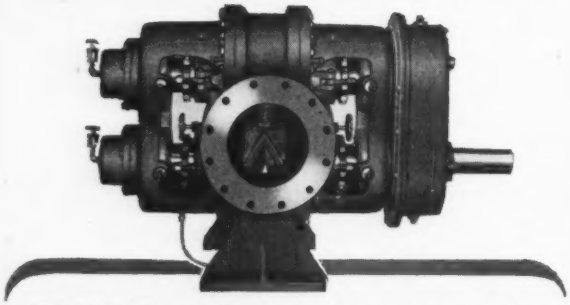
Inland Production Co. 1 Harms, SE SE NE 19-1s-14w, IP 498 bbl. from Cypress sand 2,712-22 ft., perf. 2,713-15 ft., TD 3,126 ft., PB 2,741 ft., Cypress 2,712 ft., Rosiclare 3,064 ft., McClosky 3,084 ft.

## Present Fuels Satisfactory For Stratospheric Rockets

Rocket flights passing the frontier of the earth's atmosphere can be accomplished with available rocket fuels without awaiting the advent of atomic power, Dr. J. M. Zucrow, professor of jet propulsion and gas turbines at Purdue University, told the American Society of Mechanical Engineers and the American Rocket Society at the semiannual A.S.M.E. meeting June 15-19 in Chicago.

Propellants mentioned by Zucrow included aniline and "red fuming nitric acid," ethyl alcohol and liquid oxygen (which the Germans used to drive the V-2), and liquid alcohol and liquid hydrogen. Present drawbacks to the construction of a stratospheric rocket ship are problems relating to cooling and reliable controls.


KINNEY



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THE OIL AND GAS JOURNAL
P. O. Box 1260 Tulsa, Oklahoma

## Among the

# Drilling Contractors

## Manufacturers Explain Casing Shortage To AAODC

INCREASING depth of wells and the comparatively high price of crude oil are given as reasons for the present casing shortage by one tubular-goods manufacturer in replying to a letter sent out by the American Association of Oilwell Drilling Contractors.

The association recently wrote letters to a number of leading supply companies and manufacturers asking: (1) What in your opinion is the real cause of the present casing shortage; (2) what is being done to relieve such shortages; and (3) when can the drilling industry reasonably expect the supply of casing to meet the demand.

Excerpts from the reply of one company to these three questions stated:

"In the case of our particular company, we are manufacturing more oil-country goods than we have ever made in the history of our company. It is obvious that with the price of crude oil at its high point today, everyone is desirous of drilling up their properties and cashing in as quickly as possible. This alone creates a tremendous demand for oil-country tubular goods. Furthermore, the depth of wells today has increased considerably over what it was in the past, thus requiring considerably more tonnage of pipe to reclaim approximately the same amount of oil. As far as we are concerned, we are doing nothing more than operating our plants at full capacity to relieve these shortages.

"To your question 'When can the drilling industry reasonably expect the supply of casing to meet the demand?'—we can only say that your guess is as good as ours. This is not said in any way to be facetious but it is the only answer we can give you."

Another large tubular-goods manufacturer wrote as follows:

"The present shortage is due to the large demand for oil-country tubular goods, and to the enormous demand for line pipe. In our opinion, there has been considerable diversion to line pipe which, of course, precludes the production of casing and tubing.

"If no strikes or work stoppages occur for the balance of this year, the production of our oil-country tubular goods will be the largest in the history of our company. In our opinion, the situation should be easier by the end of the year.

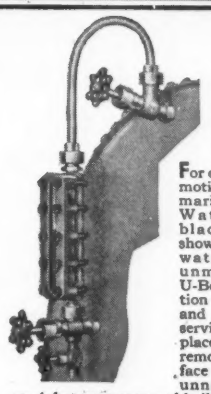
"One popular misconception is the

*J. H. Fields (second from left), and D. C. Bible (right), toolpushers for Roeser & Pendleton, drilling contractors and operators, Brookhaven field, Lincoln County, Mississippi. At left, is S. T. Beasley, Louisiana Supply Co., and third from left, L. P. Hinton, Regan Forge & Engineering Co., Brookhaven*


PENBERTHY

"REFLEX"

WATER GAGE SET



For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

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For 2⅜"-6⅝" drill pipe

(1) With patented "Varco" buttons. (2) Uniform load distribution. (3) Maximum grip area. (4) Long enduring life. (5) Light weight. (6) Chrome alloy heat-treated steel. (7) Forged alloy steel handles.

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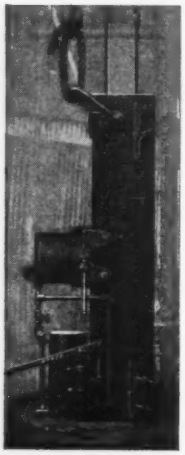
418 S.E. 29th St., Oklahoma City 9
356 No. Wolcott St., Casper, Wyo.
Export: 617 So. Olive St., Los Angeles 14, Calif.



**Don't haul Kellys, Drill Pipe, and Drill Collars to the Shop for taking out kinks and bends. . . Straighten them easily and quickly while they hang vertical in the derrick by using a . . .**

**BAKER** *Portable* **KELLY STRAIGHTENER**

**ASK THE *BAKER* MAN**

**BLACKMER PUMPS**

*The Key to*

- **LOWER PUMPING COSTS**
- **SUSTAINED PUMPING CAPACITY**
- **PUMP DEPENDABILITY**

Write for Bulletin 102 PUMPS FOR THE PETROLEUM INDUSTRY which explains why the "Bucket Design" (swinging vane principle) maintains pumping capacity by automatically compensating for wear and how the buckets, when finally worn out, are easily replaced and the pump restored to its normal capacity.

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SERVING THE PETROLEUM INDUSTRY FOR OVER 40 YEARS
REFINERY PUMPS | BULK STATION PUMPS | HAND PUMPS


amount of tubular tonnage being shipped to export. Our export shipments are now a smaller percentage of our total production than prior to the war and, of course, at no premium over domestic prices."

## Active Rotary Rigs Show Large Increase For May

An increase of 97 active rotary drilling rigs in the U. S. at the end of May as compared with April is shown by figures just released by the Interstate Oil Compact Commission.

The Rocky Mountain area accounted for the major portion of this increase with 53 more rigs active in that area. A sizable gain also was registered in the West Texas, New Mexico, and North Texas area with 38 additional rigs working. A breakdown of active rotary drilling rigs by areas is as follows:

| Area— | April | May |
|---|---|---|
| Pacific Coast | 142 | 140 |
| Kansas | 105 | 101 |
| Oklahoma | 180 | 196 |
| Rocky Mountains (including Western Canada) | 91 | 144 |
| North Louisiana, E. Texas, and Arkansas | 150 | 147 |
| West Texas, New Mexico, and North Texas | 404 | 442 |
| Illinois Area (includes Ill., Ind., Ky., Mich.) | 79 | 93 |
| Gulf Coast (includes southeast United States) | 500 | 485 |
| Total for United States | 1,651 | 1,748 |

**Fowler Drilling Co.,** Long Beach, is the contractor for the Premier Petroleum Corp. 1 Carla, 8-2s-11w, a redrill job in the Montebello area of Los Angeles County, California. Drilling is now proceding below the 6,720-ft. level.

**Regent Drilling Co.,** Calgary, Alta., has the contract for Decalta Petroleum 1, LSD 2, 27-63-23w4 in the Perryvale area of northern Alberta which will spud as soon as the company completes a test now drilling near Edgerton.

**B. G. Byars Drilling Co.** has work under way at Morris Coat 1 Ben Lackey, on an 84-acre lease in the Joseph Leech Survey, near the town of Winnfield, Titus County, East Texas. It will be a Woodbine sand test.

**Edmiston Drilling Co.,** Wichita, and Joe Canon have staked location for a wildcat, the 1 University, 1,980 ft. from north and west lines, Section 21, Block 1, University Land, Andrews County, Texas. The test is 8½ miles south of Andrews and 5 miles northwest of Midland Farms pool.

**Miller & York** have received contract for the Cantua Creek Oil Co. 1 S. P., 3-17s-15e, in the Cantua Creek area of Fresno County, California. Drilling is now progressing at 1,320 ft.

**Guy Mabee Drilling Co.,** Tulsa, will drill a test to 10,000 ft. or the Ellenburger at a lesser depth for R. Olsen Oil Co. in Lea County, New Mexico, about 3½ miles east of Jal. This wildcat is in C SE NE 23-25s-37e, and is in the approximate center of a huge subsurface structure well known to companies in the area.

**T. P. Pike Drilling Co.,** Los Angeles, is now cleaning out to deepen the Marine Exploration Co. 1 State, 11-5s-12w, in the Seal Beach area of Los Angeles County, California. This wildcat venture was originally drilled to a depth of 8,050 ft.

**Meredith, Clegg & Hunt,** Houston, are drilling at 7,360 ft. in shale in Sohio Petroleum Co. 2 W. E. Walker, Holmwood field, Calcasieu Parish, Louisiana. Contract depth 10,400 ft.

**Harry Stroud** has received a contract for a wildcat, the Ford Oil Co. and Arthur J. Boeve 1 Gerrit Wiers, SE NE NW 16-5n-13w, Ottawa County, Michigan. This test is 5 miles north of the New Salem field.

**Scott Drilling Co.** has started drilling on its 1 Mitchel, a wildcat in NE NW NW 24-12n-13w, Newaygo County, Michigan. This test is a mile south and a mile east of the Kimball Lake field and is on the edge of the town of Newaygo.


**Standco NO-SMOKE**

**STANDCO BRAKE LINING**

Stands the gaff and gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.

**Standco Brake Lining Co.**
HOUSTON

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**Drop-Forged • Heat Treated • 2 Sizes**
Durbin-Boomer F-1—2 swivels, ⅜, ½ or ⅝" chain
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**Malleable Iron • Heat Treated • 5 Sizes**
MIDGET No. 1—1 swivel, ¼" chain
DELTA No. 1—1 swivel, ⅜ or ½" chain
DIXIE No. 1—2 swivels, ⅜ or ½" chain
LONE STAR 1—2 swivels, ½, ⅝ or ¾" chain
LONE STAR 2—2 swivels, ½, ⅝ or ¾" chain

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Prepared especially for proper lubrication and protection of Tool Joint threads, Jimmie Gray's 500 Ton Tool Joint Compound* prevents washouts and galling . . . makes breaking-out easier . . . withstands highest pressures and is unaffected by heat and moisture.

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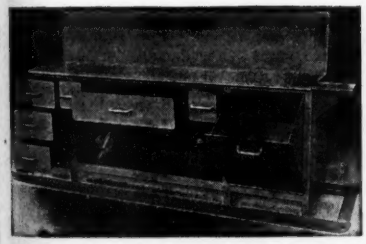
**TYPE "A" WORK BENCHES**



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These all-steel, all-welded benches provide a convenient place for all hand tools on the rig. They save drilling dollars by reducing loss and damage of tools and by saving time ordinarily spent in looking for misplaced tools.

Six big drawers and a rag bin provide storage space for all the tools on your rig. Drawers are weatherproof and mounted on rollers for easy operation.

Owen Work Benches are sold through all supply stores . . . **they're available for immediate delivery.** Order one for each rig you operate.

**OWEN TOOL COMPANY**
ROUTE 9 BOX 800-E V-2-4341
HOUSTON TEXAS


**Clayson Drilling Co.** of Illinois has been given a permit to do business in Oklahoma with Katherine Cotter, Oklahoma City, as service agent.

**K. L. Kellog & Sons,** Long Beach, are now drilling ahead below 2,091 ft. in the 51 Harbor Comm., 2-5s-13w, a new venture in the Wilmington field, California. Contract was awarded by the General Petroleum Corp.

**Malis-Thorne** are drilling a wildcat for P. F. Goldberg, the 1 E. C. Wharf, 330 ft. from west and south lines, Lot 7, Military Don 52, 3n-9w, Knox County, Indiana.

**Merrill Drilling Co.,** Mt. Pleasant, Mich., is the contractor for Rowmor Corp. 1 Herman Weber, NE NW SE 8-13n-18w, Oceana County, Michigan. This wildcat is 2 miles west of Stony Lake field.

**Woods Drilling Co.,** New Orleans, La., is drilling another Carter County, Oklahoma, wildcat with Franklin, Aston & Fair of Ardmore, Okla. Contract depth is 5,000 ft. and the well is located in 10-5s-2w.

Two new drilling companies, **Kern Exploration Co.** and **Emmons & Nichols,** have been formed in California. Kern's address is Route 7, Box 36A, Rosedale Highway, Bakersfield. Emmons & Nichols will be located in Taft.

**Delta Drilling Co.,** Tyler, and Al Brown are preparing to drill a wildcat in the Ponta area, Cherokee County, Texas. The test is the 1 J. Bailey, 330 ft. from the southeast corner of a 265-acre tract, John Russell Survey.

**Western Drilling Co.,** Longview, Tex., is testing its 1 Gregg, a semi-wildcat on the northwest side of the Levelland field, Hockley County, Texas, after reaching 4,833 ft. The test is the 1 Gregg, 660 ft. from south and east lines, Labor 25, League 731, State Capital Lands Survey.

**Clyde Hall Drilling Co.** has been awarded contract to drill the 1 Kuhn, NE NE NE 15-27s-26e, for the Independent Exploration Co. Location of the test is on a tract of several thousand acres under lease to Independent in the Northwest Premier area, Kern County, California.

**M. M. Fontaine** has contracted for two tests in Missouri. Rig is on location for the W. M. Peppas et al 1 Everett Kester, NE NE SE 28-47n-30w, Clinton County, 1½ miles southwest of Cameron, Mo. The second test, the J. E. Palensy et al 1 J. M. Slagle & Son, NW SW NE 13-64n-33w, Gentry County, is 9 miles north of Stanberry and expected to go to the Hunton lime.


**WEB WILSON Tong Dies**

"IT'S A WILSON"

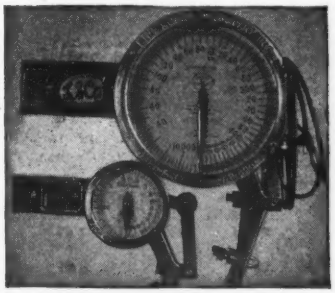
WEB WILSON Tong Dies were FIRST with vertical tooth design, bevelled ends and the full 5¾" length. USE ONLY GENUINE WEB WILSON DIES. Interchangeable in all WEB WILSON and WILSON-type tongs and in most other tongs in use in the fields today.

SEE COMPOSITE CATALOG FOR COMPLETE DETAILS

**WEB WILSON Oil Tools**
W. W. WILSON BUILDING
HUNTINGTON PARK, CALIF.



**LINE SCALES**



(Above) Super 500,000-lb. capacity, 14" dial. (Below) Packer Special, Capacity 40,000 lbs., 6" dial. 18 other models for every drilling, well servicing, or work-over need.

**20 MODELS to choose from**

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# STATISTICS and

## WEEKLY WELL COMPLETIONS . . . WEEK ENDED JUNE 14, 1947

| | Total of all wells | | | | | Cum. | | Wildcat completions and discoveries | | | | | Cumulative total, 1947 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Comp. | Oil | Gas | Dry | Footage | 1947 | 1946 | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| New York | 46 | 22 | 0 | †24 | 65,561 | 593 | 714 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 5 |
| Pennsylvania | 35 | 14 | 5 | ‡16 | 52,916 | 1,300 | 1,828 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Virginia | 17 | 0 | 15 | 2 | 53,212 | 342 | 317 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Ohio | 22 | 6 | 10 | 6 | 65,966 | 563 | 514 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 23 | 26 |
| Indiana | 12 | 5 | 1 | 6 | 21,826 | 254 | 144 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 20 | 28 |
| Kentucky | 18 | 6 | 2 | 10 | 27,568 | 260 | 206 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 20 | 26 |
| Illinois | 37 | 18 | 1 | 18 | 97,296 | 829 | 938 | 3 | 0 | 0 | 10 | 13 | 26 | 0 | 0 | 141 | 167 |
| Michigan | 24 | 11 | 6 | 7 | 51,721 | 323 | 346 | 0 | 0 | 0 | 4 | 4 | 5 | 0 | 7 | 94 | 106 |
| Kansas | 40 | 21 | 5 | 14 | 130,607 | 1,081 | 891 | 1 | 0 | 0 | 7 | 8 | 17 | 0 | 9 | 126 | 152 |
| Neb., Mo., Iowa | 0 | 0 | 0 | 0 | 0 | 2 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Oklahoma | 86 | 35 | 12 | *39 | 252,635 | 1,763 | 1,059 | 1 | 0 | 0 | 16 | 17 | 37 | 2 | 6 | 298 | 343 |
| Texas | 172 | 100 | 12 | 60 | 829,522 | 3,793 | 3,636 | 5 | 0 | 5 | 30 | 40 | 131 | 25 | 38 | 572 | 766 |
| North Central (Dist. 7B & 9) | 48 | 26 | 0 | 22 | 148,190 | 1,178 | 1,286 | 2 | 0 | 0 | 6 | 8 | 47 | 0 | 7 | 187 | 241 |
| West (Dist. 7C & 8) | 41 | 35 | 1 | 5 | 216,953 | 903 | 758 | 1 | 0 | 1 | 3 | 5 | 12 | 0 | 3 | 68 | 83 |
| Panhandle (Dist. 10) | 10 | 5 | 2 | 3 | 34,816 | 190 | 162 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 4 |
| Eastern (Dist. 5 & 6) | 9 | 3 | 2 | 4 | 50,779 | 218 | 341 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 50 | 55 |
| Gulf Coast (Dist. 3) | 33 | 16 | 4 | 13 | 221,402 | 704 | 826 | 0 | 0 | 2 | 8 | 10 | 32 | 18 | 16 | 121 | 187 |
| Southwest (Dist. 1, 2 & 4) | 31 | 15 | 3 | 13 | 157,382 | 600 | 263 | 2 | 0 | 2 | 10 | 14 | 36 | 7 | 9 | 144 | 196 |
| Louisiana | 30 | 15 | 2 | 13 | 165,562 | 549 | 605 | 1 | 1 | 0 | 3 | 5 | 18 | 10 | 5 | 76 | 109 |
| Northern | 16 | 8 | 2 | 6 | 41,398 | 282 | 327 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 41 | 44 |
| Southern | 14 | 7 | 0 | 7 | 124,164 | 267 | 278 | 0 | 1 | 0 | 2 | 3 | 17 | 9 | 4 | 35 | 65 |
| Arkansas | 2 | 1 | 0 | 1 | 10,008 | 118 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 |
| Mississippi | 24 | 15 | 1 | 8 | 193,406 | 197 | 114 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 1 | 41 | 42 |
| Southeastern States | 1 | 0 | 0 | 1 | 10,008 | 21 | 19 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 18 | 18 |
| Montana | 12 | 8 | 4 | 0 | 21,801 | 94 | 125 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 11 | 13 |
| Wyoming | 4 | 3 | 0 | 1 | 21,106 | 96 | 75 | 0 | 0 | 0 | 1 | 1 | 7 | 0 | 2 | 15 | 24 |
| Colorado-Utah | 9 | 5 | 0 | 4 | 32,382 | 81 | 54 | 0 | 0 | 0 | 4 | 4 | 1 | 0 | 1 | 18 | 20 |
| New Mexico | 11 | 7 | 2 | 2 | 34,479 | 229 | 165 | 0 | 0 | 0 | 2 | 2 | 4 | 0 | 1 | 16 | 21 |
| California | 42 | 33 | 0 | 9 | 188,990 | 886 | 838 | 1 | 0 | 0 | 8 | 9 | 21 | 0 | 3 | 130 | 154 |
| Total United States | 644 | 325 | 78 | 241 | 2,326,572 | 13,374 | 12,678 | 12 | 1 | 5 | 92 | 110 | 285 | 37 | 78 | 1,646 | 2,046 |
| Total previous week | 607 | 328 | 65 | 214 | 2,180,755 | 12,730 | 12,090 | 15 | 2 | 4 | 81 | 102 | 273 | 36 | 73 | 1,554 | 1,936 |
| Total June 15, 1946 | 580 | 323 | 68 | 189 | 1,906,869 | | | 9 | 0 | 6 | 69 | 84 | 226 | 22 | 55 | 1,425 | 1,728 |

Service wells included: *1, †24, ‡14.

## CRUDE PRICES AND REFINERY ACTIVITY

### GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

| Gravity— | Signal Hill, Calif. | Oklahoma, Kansas | Gulf Coast Tex.* | West Tex.† |
|---|---|---|---|---|
| 18-18.9 | $1.40 | .... | .... | .... |
| 19-19.9 | 1.45 | .... | .... | .... |
| 20-20.9 | 1.49 | $1.55 | .... | $1.42 |
| 21-21.9 | 1.53 | 1.57 | .... | 1.44 |
| 22-22.9 | 1.57 | 1.59 | .... | 1.46 |
| 23-23.9 | 1.60 | 1.61 | .... | 1.48 |
| 24-24.9 | 1.64 | 1.63 | $1.86 | 1.50 |
| 25-25.9 | 1.68 | 1.65 | 1.88 | 1.52 |
| 26-26.9 | 1.71 | 1.67 | 1.90 | 1.54 |
| 27-27.9 | 1.75 | 1.69 | 1.92 | 1.56 |
| 28-28.9 | 1.79 | 1.71 | 1.94 | 1.58 |
| 29-29.9 | 1.82 | 1.73 | 1.96 | 1.60 |
| 30-30.9 | 1.86 | 1.75 | 1.96 | 1.62 |
| 31-31.9 | .... | 1.77 | 2.00 | 1.64 |
| 32-32.9 | .... | 1.79 | 2.02 | 1.66 |
| 33-33.9 | .... | 1.81 | 2.04 | 1.68 |
| 34-34.9 | .... | 1.83 | 2.06 | 1.70 |
| 35-35.9 | .... | 1.85 | 2.08 | 1.72 |
| 36-36.9 | .... | 1.87 | 2.10 | 1.74 |
| 37-37.9 | .... | 1.89 | 2.12 | 1.76 |
| 38-38.9 | .... | 1.91 | 2.14 | 1.78 |
| 39-39.9 | .... | 1.93 | 2.16 | 1.80 |
| 40 and above | .... | 1.95 | 2.18 | 1.82 |

*For crude from Daboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

### A.P.I. REFINERY REPORT, WEEK ENDED JUNE 7

(Thousands of barrels)

| District— | Crude runs, daily avg. | Production: Gasoline† | Kerosine | Gas & dist. oil | Residual | Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline* | Kerosine | Gas & dist. oil | Residual |
|---|---|---|---|---|---|---|---|---|---|
| East Coast | 900 | 2,154 | 463 | 1,122 | 2,053 | 21,082 | 5,439 | 10,534 | 7,790 |
| Appalachian: | | | | | | | | | |
| District 1 | 91 | 272 | 36 | 91 | 96 | 2,380 | 217 | 420 | 244 |
| District 2 | 74 | 220 | 21 | 43 | 140 | 1,062 | 69 | 109 | 147 |
| Ind., Ill., Ky. | 822 | 2,699 | 312 | 721 | 1,048 | 17,867 | 1,484 | 3,405 | 2,855 |
| Okla., Kans., Mo. | 421 | 1,481 | 181 | 472 | 516 | 8,845 | 535 | 1,391 | 1,103 |
| Inland Texas | 223 | 1,006 | 68 | 129 | 347 | 3,661 | 249 | 344 | 666 |
| Texas Gulf Coast | 1,136 | 3,413 | 643 | 1,246 | 1,640 | 13,705 | 2,294 | 6,089 | 5,316 |
| Louisiana Gulf Cst. | 420 | 1,070 | 385 | 305 | 534 | 4,651 | 1,352 | 1,985 | 1,146 |
| N. La. and Ark. | 65 | 169 | 51 | 69 | 100 | 1,818 | 222 | 355 | 114 |
| Rocky Mountain: | | | | | | | | | |
| New Mexico | 7 | 31 | 3 | 8 | 15 | 83 | 8 | 37 | 39 |
| Other Rocky Mtn. | 133 | 417 | 16 | 159 | 212 | 3,141 | 104 | 589 | 641 |
| California | 856 | 2,418 | 132 | 921 | 2,331 | 16,507 | 705 | 11,915 | 26,718 |
| June 7, 1947 | 5,148 | 15,350 | 2,311 | 5,286 | 9,032 | 94,802 | 12,678 | 37,173 | 46,779 |
| May 31, 1947 | 5,000 | 14,709 | 2,002 | 5,732 | 8,910 | 95,876 | 12,066 | 36,032 | 45,224 |
| June 8, 1946 | 4,830 | 13,924 | 1,814 | 5,413 | 8,691 | 93,113 | 13,271 | 34,737 | 45,411 |

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 234,849,000 bbl. as of June 7—down 4,521,000 bbl. One year ago 218,589,000 bbl.

### FLAT CRUDE PRICES

Representative posted schedules per bbl.

| | |
|---|---|
| East Texas | $1.95 |
| Kettleman Hills, California* | 1.94 |
| Beauregard Parish | 1.90 |
| Illinois Basin | 2.07 |
| Pecos County, Texas (Yates) | 1.85 |
| Bradford, Pennsylvania | 4.05 |
| Eastern Ill. and Western Ind.† | 2.07 |
| Tomball, Texas Gulf Coast | 2.10 |

*37°-37.9°. †35° and above.

# TRENDS

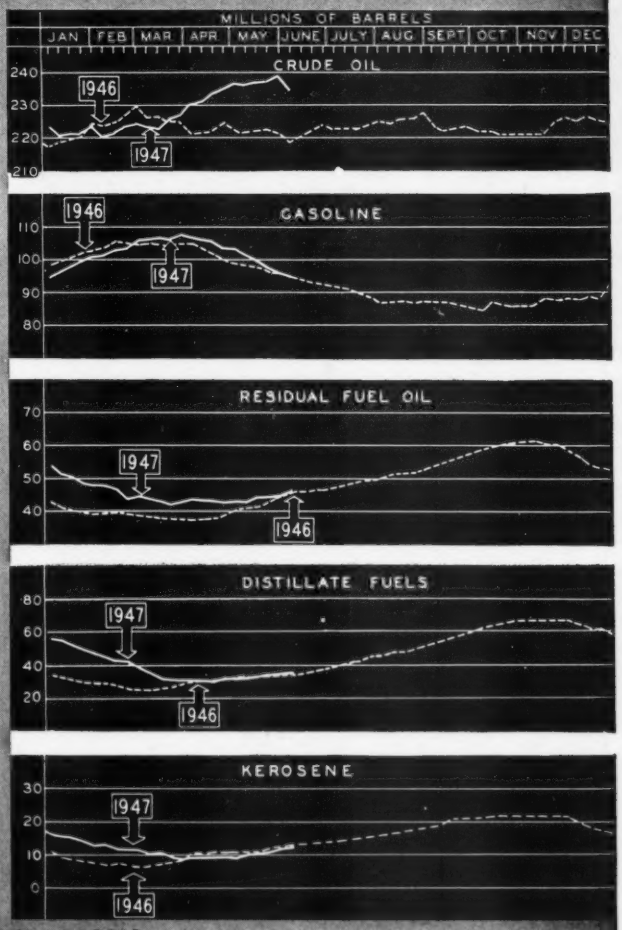
## DAILY AVERAGE PRODUCTION FOR WEEK

| | June 14 crude oil | B. of M. June demand | June 7 crude oil |
|---|---|---|---|
| Alabama | 1,250 | 1,200 | 1,200 |
| Arkansas | 81,450 | 79,000 | 80,150 |
| California | 914,800 | 884,000 | 918,600 |
| Colorado | 38,450 | 40,000 | 38,440 |
| Eastern | 64,500 | 65,400 | 66,500 |
| Florida | 1,060 | 600 | 660 |
| Illinois | 190,400 | 210,000 | 188,000 |
| Indiana | 18,800 | 18,000 | 16,800 |
| Kansas | 280,500 | 280,000 | 264,900 |
| Kentucky | 25,800 | 29,000 | 25,400 |
| Louisiana | 425,150 | 418,000 | 425,200 |
| North Louisiana | 103,750 | ..... | 103,800 |
| South Louisiana | 321,400 | ..... | 321,400 |
| Michigan | 51,060 | 46,000 | 38,850 |
| Mississippi | 95,500 | 87,000 | 93,550 |
| Montana | 25,090 | 24,000 | 19,740 |
| Nebraska | 600 | 600 | 600 |
| New Mexico | 106,000 | 103,000 | 105,950 |
| Oklahoma | 388,150 | 385,000 | 389,200 |
| Texas | 2,288,950 | 2,155,000 | 2,288,950 |
| Dist. 1 (Southwest) | 21,650 | ..... | 21,650 |
| Dist. 2 (Southwest) | 166,550 | ..... | 166,550 |
| Dist. 4 (Southwest) | 247,720 | ..... | 247,720 |
| Dist. 3 (Gulf Coast) | 494,480 | ..... | 494,480 |
| Dist. 5 (Eastern) | 39,950 | ..... | 39,950 |
| Dist. 6 (Eastern) | 116,100 | ..... | 116,100 |
| East Texas field | 334,000 | ..... | 334,000 |
| Dist. 7-C (West) | 39,500 | ..... | 39,500 |
| Dist. 8 (West) | 560,750 | ..... | 560,750 |
| Dist. 7-B (W. Central) | 39,000 | ..... | 39,000 |
| Dist. 9 (N. Central) | 141,500 | ..... | 141,500 |
| Dist. 10 (Panhandle) | 87,750 | ..... | 87,750 |
| Wyoming | 120,380 | 114,000 | 114,450 |
| Miscellaneous | ..... | 200 | ..... |
| Total United States | *5,117,890 | 4,940,000 | 5,077,140 |
| Change from prev. wk., up | 40,750 | | |

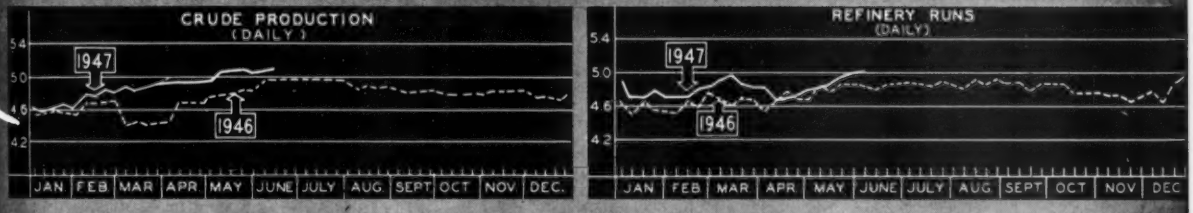
Total production January 1-June 14 ..... †807,661,100 bbl.
Same period last year (crude plus cond.).. 766,965,529 bbl.

*Not incl. 33,000 bbl. condensate. †Incl. 4,676,870 bbl. condensate.

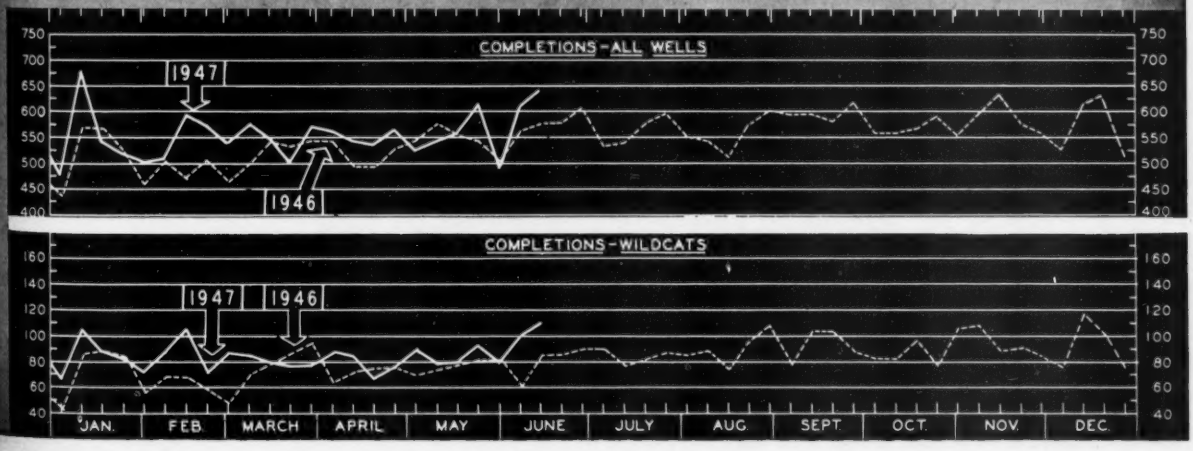
## OIL STOCKS IN THE UNITED STATES




## DAILY OPERATIONS




**Solid line charts weekly completions, service wells in Eastern area included.**

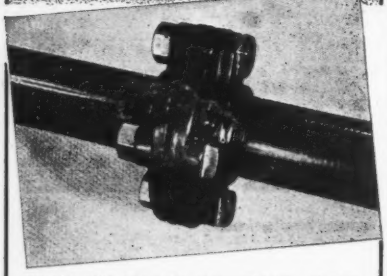


PENBERTHY
SUMP PUMPS

Used wherever seepage water accumulates, the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Drainer (water or steam operated) have demonstrated their superiority in this service. Simple and rugged design—copper and bronze construction throughout.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Saran PLASTIC PIPE
"By Commercial"
HAS WHAT IT TAKES!



HERE'S HOW TO FIND OUT WHAT IT CAN DO FOR YOU!

• Get in touch with our Engineering Department for a frank opinion on Saran pipe, tubing and fittings as applied to your particular problems. Saran is tough, durable, acid and alkali resisting, and has many other advantages for piping oils, gases and chemicals. Write for Circular OG 47.

COMMERCIAL PLASTICS CO.
201 N. WELLS ST. • CHICAGO 6, ILL.

# MARKETS

SOURCES of petroleum products bought and sold on the spot market in the Mid-Continent area were reported "drying up" this week as a bullish market, encouraged by increasingly strong demand, saw small but gradual increases in the spot prices of several products.

Demand was particularly strong for natural gasoline, with much of the material moving at 5½ cents and above, Group 3, although posted prices remained unchanged. Suppliers were expecting a general increase to be announced in the very near future.

No. 2 also was extremely tight, with the product moving on the spot market at prices up to 6¾ and some suppliers asking 6⅞ cents a gallon. Heavy fuel also was tight, with No. 6 of a low sulfur content "easily" bringing $2.25 and in some cases $2.45.

### Light Oils Scarce

Light burning oils, normally a drug on the market at this time of the year, were reported "unavailable" in many quarters during the week as dealers, anticipating a shortage this autumn accompanied by higher prices, put all they could obtain into storage.

Freely offered premiums in the spot market during the week failed to produce any large amounts of petroleum products. In most cases the tight products were going to contract accounts with little left over for bidders. Suppliers and shippers continued to forecast a strong market for the remainder of the year with no drop in prices during 1947. For light burning oils and gasoline, most were expecting increases before the end of the year.

In New York Harbor inquiries were reported increasing for heavy fuel oils, with most of the added demand coming from sources cut off from normal channels of supply. Although premiums for most petroleum products were reportedly the rule, little material was in evidence. Prices there remained firm and unchanged.

**Stanolind Oil Purchasing Co. has issued an initial posting for eight Louisiana fields, including Holly Ridge, Central Louisiana; Lewisburg and Westwego, South Louisiana; Anse La Butte, Bayou Des Allemands, and Pine Prairie, Coastal Louisiana; and Big Creek and Delhi, Northeast Louisiana. Prices in the new posting agree with previously posted prices (The Oil and Gas Journal, April 5, page 120). A Stanolind official said crude will be handled by Standard Oil Co. of New Jersey, present purchaser in the area, with exchanges to be worked out.**

### Shortage Talk Scored

In California, H. D. Collier, chairman of the board of Standard Oil Co. of California, scored reports of impending shortages of gasoline and heavy fuels, declaring: "It is my belief that certain reports that military demands will cause civilian shortages have caused unnecessary concern. So far as we can see, there will be ample supplies of gasoline for automobile owners planning trips anywhere in the Pacific West. It is also our feeling that there will be sufficient supplies of heating and furnace oils for 1947-48 winter season."

## Representative Quotations

Representative spot-market quotations of leading suppliers as of June 16, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel.

**GASOLINE, KEROSINE, AND FUEL OILS**

| | Mid-Continent Group 3 | New York Harbor | Texas Gulf Coast |
|---|---|---|---|
| Regular gasoline, 73-75 octane | 8-8.5 | 10.1-10.4*<br>9.3-9.5† | 8.5-8.75 |
| Premium gasoline, 78-80 octane | 8.75-9.5 | 10.2-12 | 9-9.5 |
| 42-44 w.w. kerosine | 7-7.375 | 7.8 | 6.875-7.125 |
| No. 2 straw fuel oil | 6.125-6.75 | 6.8-7.1 | 5.75-6 |
| No. 6 residual | $2.00-2.45 | $2.32 | $1.80-2.00 |

*Branded (74-76 octane); †Unbranded (74-76 octane).

**NATURAL GASOLINE**

| | Group 3 | North Texas | N. La. |
|---|---|---|---|
| Grade 26-70 | 5.375 | 4.875 | 5.125 |
| Grade 18-55 | 6.45 | 5.85 | 6.15 |

**LUBRICATING OILS**

South Texas

| | |
|---|---|
| 200 vis., No. 2-3 neutral | 11-12.5 |
| 750 vis., No. 3-4 neutral | 13-15.25 |
| 2.000 No. 5-6 neutral | 14.5-16.75 |

**LUBRICATING OILS**

Mid-Continent

| | |
|---|---|
| 150-160 vis. D bright stock, 0-10 p.p. | 29 |
| 200 vis. No. 3 neutral, 0-10 p.p. | 18 |

Western Pennsylvania

| | |
|---|---|
| 145-155 vis. 10 p.t. bright stock | 43 |
| 180 vis. 0 p.t. neutral | 43 |

**CRUDE-SCALE WAX**

Mid-Continent

| | |
|---|---|
| 130-132 A.S.T.M. melting point | 7.75 |

MURPHY SAFETY SWITCH Models with Visible, Adjustable Contacts Available for All Oil Field Engines

## *No More Engine Damage*

### When Lubrication or Cooling System Fails

MURPHY SAFETY SWITCHES are designed to automatically shut down engine whenever the lubrication or cooling system fails. Saves down time and prevents costly repairs.

"BUY MURPHY DEPENDABLE SWITCHES & INDICATORS IN ONE LOW COST UNIT"

*Write for information*

**FRANK W. MURPHY**
Manufacturer
Box 1476 • Tulsa, Oklahoma

# *Notice*

### To Owners of Producing Oil Properties

We are desirous of negotiating immediately for cash purchase of the operating interest in producing and proven oil properties in an amount or amounts up to a total of ten million dollars.

Would any of the following sound reasons for selling part or all of one's producing oil properties at this time apply to you?

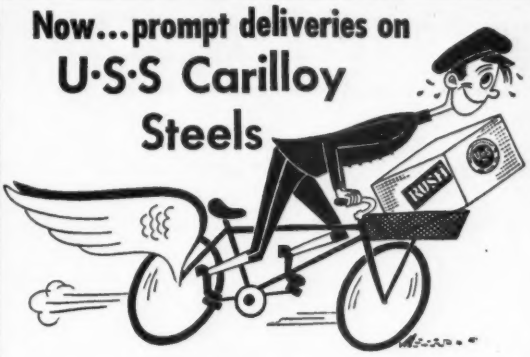
1. **To make ample provision, while living, for inheritance and estate taxes, thus eliminating the necessity of forced and, perhaps, untimely or inexpert liquidation of properties, by executors, when such properties might even be appraised by the Government at a much higher price than they could be liquidated for.**
2. **To take advantage of the tax on capital gains, which is limited to 25%, as compared with higher income taxes on current profits.**
3. **Because of advancing age or health considerations.**

Principals only.

Write, wire, or telephone Walter S. Sachs, President,

**WALTER S. SACHS & CO., INC.**
*Oil and Gas Investments*
1518 WALNUT STREET • PHILADELPHIA 2, PA.
Telephone: Pennypacker 5-6440

## Now...prompt deliveries on U·S·S Carilloy Steels




## ...the alloy steels with a Guaranteed Minimum Hardenability

## *Symbol of Service*

FOR STEEL USERS

UNITED STATES STEEL SUPPLY COMPANY
USS
STEELS
SERVICE

YOUR alloy steel requirements are best served by our stocks of constructional AISI alloy steels readily available from our warehouses. U·S·S Carilloy Steels are manufactured to a ***Guaranteed Minimum Hardenability.*** Charts are furnished with each shipment to you as your guide and assurance of this ***Guaranteed Minimum Hardenability.***

Moreover, when you place an order for U·S·S Carilloy Steel, our metallurgical service goes a step further: *We send you data with each individual shipment showing complete and specific information about the steel you receive.* This specific data on its composition, potential physical properties, and fabrication will guide you in obtaining maximum performance from the steel furnished on your order. Take advantage of all this information in supplying your alloy steel requirements. Use U·S·S Carilloy Steels from our large stocks.

## United States Steel Supply Company

| | | |
|---|---|---|
| CHICAGO (90) | 1319 Wabansia Ave., P. O. Box MM | BRUnswick 2000 |
| BALTIMORE (3) | Bush & Wicomico Sts., P. O. Box 2036 | GIlmor 3100 |
| BOSTON | 176 Lincoln St. (Allston 34), P. O. Box 42 | STAdium 9400 |
| CLEVELAND (14) | 1394 East 39th St. | HEnderson 5750 |
| MILWAUKEE (1) | 4027 West Scott St., P. O. Box 2045 | MItchell 7500 |
| NEWARK (1), N. J. | Foot of Bessemer St., P. O. Box 479 | BIgelow 3-5920<br>REctor 2-6560<br>BErgen 3-1614 |
| PITTSBURGH (12) | 1281 Reedsdale St., N. S. | CEdar 7780 |
| ST. LOUIS (3) | 21st & Gratiot Sts., P. O. Box 27 | MAin 5235 |
| TWIN CITY | 2545 University Ave., St. Paul (4), Minn. | NEstor 7311 |

UNITED STATES STEEL

# Equipment Men in the News

C. E. MEDLEY

H. WOODARD, JR.

General Industrial Supply Corp. of Fort Worth announces an expansion of its organization marked by the opening of a special sales division for the oil industry. Heading the new department is **C. E. Medley**, sales manager of oil-field-supply division, and assisting him is **H. A. Woodard, Jr.**, of Tulsa, as sales engineer. The new division will have its headquarters in Tulsa at 533 Mayo Building and will specialize in electrical materials such as motors, starters, transformers, etc. The new division will function in the Mid-Continent area and will be able to draw material from the two warehouses located at Fort Worth and Dallas, as well as direct from the factories. General Industrial Supply Corp. is distributor for such companies as Dodge Manufacturing Co.; Cutler-Hammer, Inc.; Federal Electric Products Co.; U. S. Rubber Co.; Pittsburgh Valve & Fittings Corp., and many other leading manufacturers of industrial and electrical supplies.

The Council of British Manufacturers of Petroleum Equipment, a nontrading, privately sponsored, manufacturers organization with a membership of some 250 British firms engaged in supplying equipment to the British oil industry, has extended an invitation to give assistance to oil-equipment manufacturers planning to visit Britain. The organization's principal work is to afford a channel of technical information among its members, the British oil companies, and others interested in petroleum equipment. The director, **T. L. Bonstow**, has offices at 40 Palace Chambers, Bridge Street, Westminster, London, and will facilitate immediate contact with English firms sought by American visitors.

**J. Howard Samuell**, for many years district geologist and petroleum engineer for the West Texas and State of New Mexico operations of Lane-Wells Co., has joined the staff of the First National Bank in Dallas. Samuell will assume his duties in the oil department of the bank as a petroleum engineer under direction of **Eugene McElvaney**, vice president in charge of this department of the bank's operation.

**Paul Randels** will concentrate sales and operations directions of the Oil Field Division of Black, Sivalls & Bryson, Inc. He will move his executive headquarters to Kansas City and will coordinate all oil-field sales activities in company branches and sales offices.

**F. A. Stevenson** has resigned as president of American Car & Foundry Co., New York. **Charles J. Hardy, Jr.**, who heretofore had served the company as its executive vice president, has been elected by the board of directors to the presidency, succeeding Stevenson.

**Jay E. Miller** has been appointed advertising and sales promotion manager of the associated tire and accessory lines division of the B. F. Goodrich Co. This division merchandises the Brunswick, Diamond, Hood, and Miller brands of the company. Miller had been advertising and sales manager of the company's industrial products sales division since 1943, and for 5 years previously, had held the same post in the sundries division.

Leslie Co., Lyndhurst, N. J., announces the appointment of the following agents to handle industrial sales and service: Sherwood Bishop Co., 413 Woodland Street (Manchester), Hartford, Conn.; and Harold W. Frederick Co., North 213 Division Street, Spokane, Wash.

R. A. DAY

N. H. ANDERSON

**R. A. (Bob) Day** has joined Guiberson Corp., Dallas, and will headquarter in Tulsa. He was previously a member of the sales department of Oil Well Supply Co. in Tulsa, and prior to that Illinois sales representative for Miller Sand Pump Co. Day began his career in the oil-field equipment-supply business as store manager for National Supply Co. in the Mid-Continent area. **N. H. Anderson**, for 12 years Guiberson sales and service representative, will continue in this capacity, making his headquarters in Oklahoma City.

**Reese B. Lloyd** has been named manager of the western plants of Rheem Manufacturing Co. He will make his headquarters in Los Angeles.

**Alfred D. Howard**, formerly assistant sales promotion manager of Servel, Inc., has been appointed assistant general sales manager of Kaiser Fleetwings Sales Corp., Oakland, Calif., and Bristol, Pa.

**H. C. Wallace** has been appointed manager of Air Reduction Sales Co.'s Louisville district. Wallace succeeds R. S. Moore, recently deceased.

**R. G. Greer**, formerly manager of the Louisville general line branch of International Harvester Co., has been appointed assistant eastern district manager, motor-truck division. **R. H. Curll**, formerly retail manager at Burlington, Vt., has been appointed assistant manager at Harrisburg, Pa., motor truck branch.

**Carl B. Pollock**, manager of the Brackenridge, Pa., plant of Allegheny-Ludlum Steel Corp., has been appointed manager of the company. Assuming his new duties immediately, he will serve as assistant to the production head, and will correlate the production of all company plant and manufacturing facilities. He also will have general supervision of scheduling production operations, and will be in charge of customer relations from a standpoint of production. Pollock is succeeded as manager of the Breckenridge plant by **George W. Evans**, veteran employe who had been assistant plant manager.

**Giles C. Hoyt** and **General Levin H. Campbell, Jr.**, were recently elected executive vice presidents of International Harvester Co. by its board of directors. Other changes in the company's top management are as follows: **William E. Worth**, formerly executive vice president, has retired after 27 years of service with the company. **Robert P. Messenger**, formerly vice president in charge of the farm implement division, becomes vice president in charge of foreign operations, succeeding Hoyt. **Ralph C. Archer**, formerly vice president in charge of the farm tractor division, becomes vice president in charge of the farm implement

*Such topics as cooperation with national engineering societies, fuel oils, and crankcase explosions highlighted a recent meeting of engineers in the diesel-engine industry at Cleveland. The session was held under the auspices of the Diesel Engine Manufacturers Association. Attending were: (Seated) J. P. Hyde, chief engineer, Ingersoll-Rand Co.; Charles Fike, chief electrical engineer, Cleveland Diesel Engine Division, General Motors Corp.; Roy A. Hundley, chief engineer, Enterprise Engine & Foundry Co.; L. B. Jackson, director of engineering, Diesel Division, American Locomotive Co., (chairman of meeting); Harvey T. Hill, executive director, Diesel Engine Manufacturers Association; Knute O. Keel, chief engineer, Cleveland Diesel Engine Division, General Motors Corp.; Ralph L. Boyer, chief engineer, Cooper-Bessemer Corp.; Robert P. Ramsey, chief engineer and vice president, General Machinery Corp. (Standing), George H. Ambers, D.E.M.A. staff; George Steven, executive engineer, Worthington Pump & Machinery Corp.; E. F. McBride, installation engineer, The Baldwin Locomotive Works; Edward J. Harley, executive manager, Diesel Engineering Department, The Baldwin Locomotive Works; C. E. Cox, chief engineer, Chicago Pneumatic Tool Co.; Ervin L. Dahlund, assistant to director of engineering, Fairbanks, Morse & Co.; John M. MacKendrick, vice president in charge of engineering, Clark Bros. Co., Inc.; Emil Grieshaber, chief engineer, Nordberg Manufacturing Co.; George J. Rathbun, president, The Rathbun-Jones Engineering Co.*

division. **Michael J. Graham,** formerly assistant to the vice president in charge of manufacturing, has been appointed general manager of the farm tractor division, and succeeds Archer as executive head of that division of the company.

A new branch plant of Timken Roller Bearing Co., Canton, Ohio, was formally opened recently in St. Thomas, Ont., Can., with a brief ceremony in the plant which was followed by an "open house" to which the public was invited. The plant now has a roster of 225 employes, of which some 30 are supervisory personnel who were in the Canton bearing factory for several months learning operating methods and policies.

*D. H. THORNBURY*

*J. A. DAUGHERTY*

**D. H. Thornbury,** vice president of Mid-Continent Supply Co., is being transferred from Houston, where he managed the Gulf Coast area, to the general offices at Fort Worth. His new position will be executive vice president directly under Ken W. Davis, president. Vice President **J. A. Daugherty,** now in charge of the Tulsa and Northern Division, is taking over Thornbury's place at Houston and will be assisted by W. I. West, former West Texas-New Mexico division manager. West, who was previously located at Houston, will become the division manager of the Gulf Coast area. The job of managing the Tulsa and Northern division is going to **S. R. Clinkscales,** former division tubular manager at Tulsa. **T. P. Tarwater,** former district manager at Odessa, is being put in charge of the West Texas-New Mexico area, with **A. T. Skaer** as the new general district manager. This consolidated district includes in Texas—Odessa, Kermit, Fullerton, and Sundown; in New Mexico—Eunice and Hobbs.

***Breaking ground for the expansion of The Trailmobile Co. plant at Los Angeles, which will more than triple its productivity capacity in southern California, are: Scott Felty, Trailmobile manager in Los Angeles; Wade T. Childress, president of the company; and Joseph Kuttler, Trailmobile vice president in charge of Pacific Coast operations***

# Classified Advertising

## *The Market Place for the Oil Industry*

### EQUIPMENT FOR SALE

RL Double Drum Cardwell Spudder complete with lines, tools, doghouse and light-plant. Reasonable. P. O. Box 1843, or phone 8-3587, Oklahoma City, Okla.

FRANKS Model F-47 shot hole drill on 1942 1½ ton Chevrolet, and 500 gallon water truck. Price $6000.00. Box B-777, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: At Oil Hill, Kansas, 26 joints, 18'—20' Random Lengths, 2⅜" OD Drill Pipe with Hughes Tool Joints, for Core Drill Machine, price $1.50 per foot. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

NEW WELDED STEEL TANKS: Used Welded & Bolted Steel Tanks, Grain Tanks, 8—5,000 bbl. New A.P.I. Bolted Steel Tanks, 3—10,000 bbl. New A.P.I. Bolted Steel Tanks. Reset tank work. Independent Tank Co., Seminole, Oklahoma, Box 192, Phone 977.

Model 200 Sullivan Drill mounted on 1941 tandem White truck, complete with all drilling accessories, 1800 ft. 2⅞ in. drill pipe, 5 x 8 Gardner-Denver Pump, Kohler light plant, etc. Purchased new in May 1945. Never drilled below 1500 ft. Located at Grandfalls, Texas. Write Box 1022, or call 813 Del Rio, Texas.

1 No. 3 National Drilling Machine complete, extra good tools 18" down to 5". New Caterpillar Diesel 13,000. New Kolhon Light plant. National poles, dog house, drilling lines, hand tools, a complete outfit, price $15,000.00. A. D. Allison, 715 Brown Bldg., Wichita, Kansas.

1 Steam Rotary Rig suitable for 6000 ft., ready to rig up with all tools and accessories. Includes 7700 ft. 4 in. drill pipe, and 2 122 ft. derricks. For further information, call Jackson 3-1724, or write Box 214, Jackson, Mississippi.

New and Reconditioned
**VALVES and FITTINGS**
**VICTORY SUPPLY COMPANY**
Phone 5-2073 P.O. Box 754
Tulsa, Oklahoma

### EQUIPMENT FOR SALE

FOR SALE: 45 Star Spudder in good condition. 1 run pipe, like new. 2200' 5½ O.D. 17# Seamless, 2000' 7" O.D. 20# Seamless, 1250' 8⅝ O.D. 24# Seamless. Write or call J. E. Jolly, Princeton, Indiana.

FOR SALE: Shaffer power draw works, powered by two J. L. 1335 Buda engines compounded. Suitable for 5,000 foot work. In A-1 condition. Price $7,500. Terms. Melton Well Service, Box 1360, Seminole, Oklahoma.

FOR SALE: 1—6500 G Caterpillar engine with Foote double reduction geared unit complete with two Bovaird straight lift jacks, rod lines and Norris counterbalance to pump two wells. Jay Kornfeld, Phones 4-2121, 6-5202, 1121 Union National Bank, Wichita, Kansas.

**NEW 1000 LB. PRESSURE GAGES IN ORIGINAL SEALED FACTORY CARTONS**

(For Water, Steam, Air, Oil, Etc.)
300 Clapp #400, Phenol case, back mounting, Bourdon Tube type, 4½ in. face, ½ in. connection. This gage manufactured to same specifications as the Ashcroft Gage #1279 E. Price $7.00 ea., $6.00 ea. in dozen lots. (Catalog price $16.00). 200 Ashcroft #1079 E Steel case Duragage. 4½ in. face ½ in. connection. Price $9.00 ea., $8.00 ea. in dozen lots. (Catalog price $18.00).
F.O.B. Tulsa
Sample of above gages will be sent for your inspection
**MIKE A. TRAVIS**
P.O. Box 1343 Tulsa, Oklahoma

FOR SALE
**STEEL STORAGE TANKS**
38—10,000 Gallon Capacity Tank Car Tanks
**CLEANED PAINTED TESTED**
Located in Oklahoma
**IRON & STEEL PRODUCTS, INC.**
42 years' experience
13412 S. Brainard Avenue
Chicago 33, Illinois. PHONE BAYport 3456
**"ANYTHING containing IRON or STEEL"**

**LEAD COVERED CABLE**
**New—On Original Reels—Standard Construction**
No. 2 Stranded 3 Conductor—Type RL, 600 Volts
270 Rolls—Approx. 500 ft. ea.—6 Rolls—Approx. 1500 ft. ea.
Priced to Sell F.O.B., K.C., Mo. **46c Ft.** Quantity Discounts 6 or more reels.

**Brand New WIRE ROPE**
On Original Reels 400,000 ft. Hemp Center
200,000 ft.—¼"—6 x 19 Improved Plow Steel Galvanized
160,000 ft—¾"—6 x 37 Improved Plow Steel Preformed
15,000 ft.—⅞"—6 x 12 Plow Steel Galvanized
6,000 ft.—1¼"—6 x 37 Plow Steel Galvanized
19,000 ft. 1¼"—6 x 37 Plow Steel
Substantial Discounts on Large Quantities—Savings Up to 50%
**Immediate Delivery—Write, wire or phone**
**BROWN-STRAUSS CORP.**
Box 78—Phone HA. 1000 Kansas City 10, Mo.

## EQUIPMENT FOR SALE

FOR SALE: Six New Kobe, 2⅛ inch tubing insert, pumps, one Triplex—Bargain for immediate sale. Ben Beckham, Jr., Box 134, Overton, Texas. Phone 3921.

FOR SALE: New 36-L Bucyrus-Erie spudder with casing strut, crane, extra guy lines, turnbuckles, etc. $12,000.00 cash. Joe Claypool, St. Elmo, Illinois.

FRANKS KELLY MODEL 150 Drill; excellent condition, complete with water truck, drill rods, and tools. Now working in Oklahoma. F. R. Findley, P. O. Box 6508, Houston 5, Texas.

FOR SALE: 1—Franks winch, Model SR, with 7″ telescope mast mounted on 1935 International truck, will pull 4500′ to 5000′ wells. 1—Cardwell double drum clean out machine, Model KSD65, with DHK Waukesha. 1—Thrift hydraulic casing pulling machine with 3″ and 5″ jacks, Tulsa friction winch, mounted on 1937 D-40 International with new K-7 motor. Write or call Jenkins Supply, Blackwell, Oklahoma.

## EQUIPMENT FOR SALE

FOR SALE: Model K Cardwell, perfect condition w/5″ & 7″ tools complete. Morris & Son, Box 107, Carmi, Illinois.

### SHOT HOLE DRILLS
### LARGE AND SMALL

All are truck mounted, rotary, chain pull down, smallest pump size is 4 x 6 Condition of same is excellent, others are in need of repair. Price F.O.B. Dallas is from $3,000 to $8,000 with truck. For details write:

**8806 Lemmon Avenue**
**Dallas, Texas**

## EQUIPMENT FOR SALE

FOR SALE: New 5″ x 10″ Worthington TYPE KMS-1 Pump. Box B-733, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1—14″ x 14″ Ideal horizontal twin cylinder steam drilling engine. 2—15½″ x 8½″ x 20″ Ideal steam slush pumps. Excellent condition. Priced right.
**Lucey Products Corporation,**
**Tulsa, Oklahoma.**

1—New R. L. Double Drum Cardwell Unit powered with WAK Waukesha engine; 1—R. L. Model, Double Drum Cardwell in first class condition, new MO-893 Buda engine, new bearings in jack shaft and lower drum and relined brakes. Both good buys. Write Box B-774, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Gas Meters—2 25B 100-lb. Case, 3 60B 20-lb. Case, 1 60B 25-lb. Case, 1 60B 75-lb. Case, 1 80B 100-lb. Case, 1 #3 Tobey, 2 #4 Tobey. All overhauled and tested. The Acme Foundry & Machine Company, Coffeyville, Kansas. Telephone LD-7040.

## REFINERY EQUIPMENT FOR SALE

One—3″ Pacific Hot Oil Pump, ten stage, direct connected to 600 H.P. 3 stage, G. E. Steam Turbine.
One—3″ Pacific Hot Oil Centrifugal Pump, seven stage, direct connected to 400 H.P. 3 stage, G. E. Steam Turbine.
One—30 x 7 x 20 Burnham Twin Simplex Hot Oil Pump.
1,975 Ft.—3¼ I.D. x 4¼″ O.D. Tubing, 4-6 Chrome—in 25-ft. lengths, plain end.
One—Fractionating Tower, 6 ft. x 39 ft. x ⅜″ shell—20 steel bubble trays.
Two—5 ft. x 30 ft. Pressure Vessels, lined with lead and acid resisting brick.
Pressure vessels to 30,000 gals. capacity, Centrifugal and Reciprocating Pumps, Heat Exchangers, Valves.
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## ROTARY RIG

1—Model D-200 Portable Rig. Co. Mechanical-driven rig as follows:
1—36″ x 5½″ 3-speed reverse clutch unit.
1—Drawworks power unit complete with reduction gear.
1—Pump power unit complete with reduction gear.
1—Set necessary V-Belt drives and pulleys to pull 7¼″ pump.
1—Set Guards over all moving chains.
1—Low substructure.
1—Set braces between units with clamps.
1—Dual throttle control.

2—Model 6LSS Waukesha Units complete, Serial #383399-383400.
2—Special made extra heavy radiator guards with skid type base for engines.

1—#34-26 Type B 3-shaft 4-speed drawworks—Unitized in field with 7½″ drumline and jack shaft, heavy duty Hyatt roller bearings 26″ dia. x 35″ long grooved drum, 46x10 rolled steel PL brake rims, carbon steel sprocket and clutches except HS Drum shaft sprocket and clutch and JS Rotary drive sprocket and clutch which are manganese steel and with Type K Brakes and CI extended cat head on drillers' side, less chain and cat head with sprocket chain guard jack-shaft end.

1—7¼″ x 14″ Type B Ideal Duplex power driven slush pump, Serial #T-50 complete with RH chain driven oil pump, new style wide eccentric NS lead bronze ecc. rod bushings, torch hardened gears, type F valves and seats, Type FT pistons and rods, long steel skids for electric motor drive, but less U-belt drive.
1—15 groove belt pulley.
1—Suction pipe and hose.
Liners: 7⅝″, 7¼″, 7⅛″, 6⅜″, 6½″.
5—Extra pistons.

1—1⅛″ x 1250′ Rotary Line.
1—Set 5⅞″ Rotary Tongs with Handles.
1—150 Ton BJ Triplex Rotary Hook with Locking Arms.
1—5-sheave Type Regan Crown block.
1—62″ 4 sheave Regan Traveling Block with Swivel.
1—#12—25½″ Ideal Rotary Table with Steel Skids, Carbon Steel Sprocket, 14 tooth #3 chain and including 1 set split table bushings, 1 split table bushing hook, 1 locking bar, 1 breakout post, 1 rotary sprocket guard.
1—6″ Type AA Ideal Rotary Swivel Complete with val type wash pipe packing coupling and hose connection for 2½″ hose.
1—Auxiliary Unit complete, consisting of:
1—Model FLU Waukesha Engine Model FL28B, #575631.
1—3 KW Westinghouse Generator #1-39N625.
1—3 x 3½ Duplex air cooled Gardner-Denver Compressor.
1—2″ Type C Gardner-Denver centrifugal pump.
All mounted on skids and connected with necessary air tanks, pulleys, belts, clutches, etc.
1—Set 2¾″ x 84″ BJ Weldless Elevator Links with handles.
1—30′ x 6′ Special made tool rack.
1—6″ Baash-Ross roller bearing drive bushing for rotary table #1983 (Less Rollers).
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1—122′ Rotary Derrick (stacked) (Lee C. Moore—Angle Iron).
7—Jts. 5⅞″ Drill Pipe.
1—American Automatic cat head.
1—13″ OD x 5⅞″ OD #5 McEvoy Blowout Preventor, complete.
2—Sets 15½″ C.P. Reaming bit cutters.
1—9⅞″ Reed Set Bit #6383 (New).
1—13⅜″ Braden Head #1151136.
1—13⅜″ Hughes Master Gate Valve.
1—13⅜″ Casing Spider.
1—Set 8⅝″ Ideal Elevators.
3—Sets 7″ Wilson Elevators.
1—8⅝″ Hughes Master Gate Valve.
1—8⅝″ O. W. I. Control Head.
1—7″ O. W. I. Control Head.
1—7″ Larkin Packer.
1—7″ Swab.
1—Set 5½″ Jars.
1—Rope Socket.
1—Spear.
1—Set 5½″ Wrenches.
1—Circle and jack.

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1 Allis-Chalmers Type EB120 D.C. Ex- 715 Amps., 1200 RPM, Serial #132379.

1 Allis-Chalmers 300 HP—350 Volts, 1000 RPM, 699 1 hour or 520 Cont. Svc. Drawworks Motor Serial #132452.

1 Allis-Chalmers Type EM-2 Switchboard Complete (Ser. #3X5334) with Cutler-Hammer Control (Ser. #B105711) with all Cables and (1) 1¼ HP D.C. Compound wound Blower Motor, 10 Amps., 125 Volts., 1800 RPM, Ser. #9076MK-51DE-1.

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